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# CTOS®

# Basic Asynchronous Terminal Emulator

## User's Guide

CTOS I 3.3
CTOS II 3.3
CTOS/XE 3.0/3.1

June 1991

Priced item

Printed in USA
4357 4680–100

# CTOS®
# Basic Asynchronous Terminal Emulator
## User's Guide

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# About This Guide

This guide is your introduction to using the Basic Asynchronous Terminal Emulator (Basic ATE). It describes how to use Basic ATE to transfer files, access a wire service, and troubleshoot a serial printer.

This guide is written for users who may have basic file transferring needs among either compatible or incompatible workstations. It is also written for the system administrator who needs to perform troubleshooting activities.

Using this guide requires a basic understanding of and familiarity with Executive commands. If you are not familiar with the Executive, see the *CTOS Executive User's Guide* and the *CTOS Executive Reference* for more information.

## Organization of This Guide

Before you proceed any further, check the following information carefully for orientation. Then turn to the appropriate section.

- Section 1 introduces four typical scenarios that describe using Basic ATE for various activities. Find the application that resembles your needs and follow the steps to complete your application. (You may need to set up your workstation first. Cabling is described briefly in this section.)
- Section 2 describes all functions and capabilities of Basic ATE. This section helps you learn Basic ATE at a more detail-oriented pace and is best suited for users who already know how to use Basic ATE.
- Section 3 describes script files and how you can create one to perform repetitious tasks automatically. These tasks would include logging on to a computer system. Although script files are not essential, you can save time once you start using them.

- Section 4 describes communications protocols.
- Section 5 describes possible system and voice processor module errors. It also describes how to recover from and correct them. Section 5 is also a general troubleshooting guide.
- Appendix A describes the ASCII code conversion that Basic ATE uses. This section is for your reference.

# Related Documentation

The documentation below provides additional information related to the contents of this guide.

Information pertaining to cabling can be found as follows:

If you are a BTOS user, see the *BTOS Hardware Network Reference Manual.*

If you are a CTOS user, see the hardware technical reference manual for your processor module.

The *CTOS System Software Installation and Configuration Guide* describes installation and setup of your operating system and standard software utilities.

The *CTOS System Administrator's Guide* describes the administrative aspects of the CTOS and CTOS/VM operating systems. It includes instructions for setting up various operating system types, installing system services, adding application software, and installing peripheral devices. It also describes SRP workstation configuration, system protection, nationalization, and operating system customization.

The *CTOS Executive User's Guide* describes the most commonly used Executive utilities and features. It provides step-by-step procedures for performing many tasks, such as copying files, backing up disks, and creating macrocommands. This guide also includes detailed information about using the file system.

The *CTOS Executive Reference* addresses command execution, file management and protection, and program invocation. It also provides descriptions and details about parameter fields for Executive commands.

The *CTOS Editor User's Guide* describes how to use the Editor to create or modify an ASCII text file.

*Using the Operator* introduces new users to the Operator telephone management system and serves as a reference for experienced users. The Operator telephone management system simplifies making calls, keeps a directory of telephone numbers, and, like an answering machine, answers incoming calls. The manual also includes information for the system administrator about how to set up data calls through Basic ATE.

The *CTOS Status Codes Reference Manual* contains complete listings of all status codes, bootstrap ROM error codes, and CTOS initialization codes. The codes are listed numerically with troubleshooting explanations.

The *CTOS Debugger User's Guide* describes how to use the Debugger commands to debug programs on real and protected mode operating systems. The manual provides hands-on exercises in using the commands as well as debugging tips.

# Section 1
# Using Basic ATE

## Welcome To Basic ATE

Consider the following:

- The engineering teams of two aerospace corporations need to quickly combine their resources for a possible joint venture. They must transfer some files between their workstations before the proposal due date. The good news, they share the same office floor; the bad news, their workstations are incompatible.
- A romance novelist in New York City wants to transfer another section of her manuscript to her agent, who happens to be on a six-month vacation in Los Angeles. The agent has access to an identical workstation in Los Angeles.
- A business executive wants quick access to the stock market index to check on a hot tip he just received from a friend.
- An insurance company just acquired a serial printer for its Claims department so that it won't have to share with Accounting anymore. The new printer does not seem to work.

These people are in luck. They all have Basic Asynchronous Terminal Emulators (Basic ATEs), software they can use on their workstations that allows them to access the information they need quickly. Read on to learn how.

## What Basic ATE Can Do

Basic ATE allows your workstation to emulate (act like) an asynchronous (immediate transmission) terminal (workstation).

In addition to displaying the characters on your video screen, Basic ATE can record (store) characters it receives in a file for later reviewing, editing, or printing.

This section teaches you how to use Basic ATE by leading you step-by-step through each practical situation summarized below. The applications are then followed by thorough procedures for using Basic ATE to complete each.

If you want to examine Basic ATE and its capabilities in greater detail, go directly to Section 2, "A Closer Look at Basic ATE."

## Application 1: Transferring Files Between Incompatible Workstations

Since the engineering teams share the same office floor, they simply connect their workstations together with a cable and use Basic ATE to transfer their files. The two workstations do not need to be compatible because Basic ATE automatically converts the information into ASCII code.

## Application 2: Transferring Files Between Remote Compatible Workstations

Since the romance novelist wants to send part of her manuscript across the country, she must use the telephone lines to transfer the information. Depending upon her workstation, she can either connect a modem between her workstation and the telephone or use the telephone feature (Voice Processor Module) of her workstation to hook up to the telephone line. After doing so, she can use Basic ATE to send the information over the telephone line.

## Application 3: Accessing a Wire Service

Gaining access to a wire service through the telephone network is a simple matter. As in the previous application, this person either connects a modem between the workstation and the telephone or uses the telephone feature (Voice Processor Module) of the workstation to hook up to the telephone line. Once this is done, Basic ATE can access the information over the telephone network.

### Application 4: Troubleshooting a Serial Printer

The insurance company can troubleshoot its new printer by using Basic ATE. After setting up the correct cable between a workstation and the new printer, the Claims department can use Basic ATE to send information to the printer and can then check the information for accuracy.

## Before You Begin

Before you go through the appropriate application, you have to set up your workstation with the correct cabling. See the description below in "Setting Up Your Workstation." Since this guide does not describe cabling in depth, see your system administrator for the correct cabling.

When you go through the application, notice that certain words are in **boldface** type. These boldface words represent specific keys on your keyboard, for example, **RETURN**.

***Note:*** *When you create files in one of the word processing or office publishing packages, your workstation automatically places special transparent control characters at the end of each file. These characters may not be recognized by certain modems, causing inaccurate data transmission. Before sending these files via a modem, delete the special characters by using the Remove Format command. (See your word processing documentation.)*

## Setting Up Your Workstation

You can set up your workstation in one of the following ways:

- Modem connection
- Direct cable connection between a workstation port expansion module (that is, DCX or XC-002) and any other serial data communications device
- Telephone connection using a Voice Processor Module

See your workstation hardware installation manual for more information.

Common cables are listed below. See your system administrator for the proper cable.

| Connection | Cable |
|---|---|
| Workstation to workstation | RS-232-C crossed |
| Workstation to modem | RS-232-C straight-through |
| Workstation to printer | RS-232-C crossed |

# Application 1: Transferring Files Between Incompatible Workstations

For this example, your workstation connects to another computer with a crossed RS-232-C cable. Your end of the cable connects to one of the communications channels of your workstation – in this case, channel B. The other computer must be set up according to its Basic ATE feature.

***Note:*** *If a direct cable connection will not reach your workstation from the other computer, use a modem (attached via a straight-through RS-232-C cable to channel B of your workstation), or use line 2 of the Voice Processor Module connected to your workstation.*

1. Set up your modem and cable connections. Common settings for computers and modems are:

| Computer Connection | Modem Connection |
|---|---|
| 9600 baud | 2400 or 9600 baud |
| 7 data bits | 7 data bits |
| odd parity | odd parity |
| 1 stop bit | 1 stop bit |

Use these settings for this application, and make sure the other workstation (or its modem) also matches these settings. (See the applicable manufacturer's manual for your modem.)

2. Sign on to your workstation.

   Your workstation screen enters either the Context Manager or the Executive. If your workstation enters the Context Manager, continue with step 3. If your workstation enters the Executive, skip to step 4.

3. If you are accessing Basic ATE through the Context Manager, select Basic ATE from the Context Manager screen, and press **GO**.

4. Type either

   Basic ATE

   or

   B A

   and press **RETURN**.

*Note:* *If you accidentally press* **GO** *instead of* **RETURN**, *Basic ATE starts running. Press* **FINISH** *to return to the Executive and start over. (See the* CTOS Executive User's Guide *for more details.)*

5. The Basic ATE command form appears on your screen. Four different setups are possible for this application, each shown below in the example command forms. Type the correct options for your setup, using **RETURN** or the up-arrow and down-arrow keys to move the cursor from option to option.

If you are using an RS-232-C crossed cable, use the values shown below.

| Basic ATE | |
|---|---|
| [Recording filename] | |
| [Comm channel] | [comm]b |
| [Baud rate] | 9600 |
| [Stop bits] | 1 |
| [Parity] | odd |
| [Data bits] | 7 |
| [Display mode] | hdx |
| [Auto linefeed?] | |
| [Recognize escape code?] | |
| [Receive Timeout] | |
| [Send Xon/Xoff?] | |
| [Script filename] | |
| [Open mode] | |
| [Originate?] | |
| [Dial string] | |
| [Dial time out] | |
| [Half duplex modem?] | |

If you are using the Voice Processor Module modem, use the values shown below.

| Basic ATE | |
|---|---|
| [Recording filename] | |
| [Comm channel] | [comm]b |
| [Baud rate] | baud rate |
| [Stop bits] | 1 |
| [Parity] | odd |
| [Data bits] | 7 |
| [Display mode] | hdx |
| [Auto linefeed?] | |
| [Recognize escape code?] | |
| [Receive Timeout] | |
| [Send Xon/Xoff?] | |
| [Script filename] | |
| [Open mode] | |
| [Originate?] | |
| [Dial string] | telephone number |
| [Dial time out] | |
| [Half duplex modem?] | |

where baud rate is the appropriate baud rate, and telephone number is the appropriate telephone number. When specifying a telephone number, include an equals sign if your workstation needs to wait for a dial tone before dialing the number. (For example, 9=767-1111 means that your workstation sends 9, waits for the dial tone, then sends the rest of the number.) See your modem manual for more information.

If you are using the Voice Processor Module to dial a call, use the values shown below.

| Basic ATE | |
|---|---|
| [Recording filename] | |
| [Comm channel] | [phone]2 |
| [Baud rate] | baud rate |
| [Stop bits] | 1 |
| [Parity] | odd |
| [Data bits] | 7 |
| [Display mode] | hdx |
| [Auto linefeed?] | |
| [Recognize escape code?] | |
| [Receive Timeout] | |
| [Send Xon/Xoff?] | |
| [Script filename] | |
| [Open mode] | dial |
| [Originate?] | yes |
| [Dial string] | telephone number |
| [Dial time out] | |
| [Half duplex modem?] | |

where baud rate is the appropriate baud rate, and telephone number is the appropriate telephone number. When specifying a telephone number, include an equals sign if your workstation needs to wait for a dial tone before dialing the number. (For example, 9=767-1111 means that your workstation sends 9, waits for the dial tone, then sends the rest of the number.) See your modem manual for more information.

If you are using the Voice Processor Module to receive a call, use the values shown below.

| Basic ATE | |
|---|---|
| [Recording filename] | |
| [Comm channel] | [phone]2 |
| [Baud rate] | baud rate |
| [Stop bits] | 1 |
| [Parity] | odd |
| [Data bits] | 7 |
| [Display mode] | hdx |
| [Auto linefeed?] | |
| [Recognize escape code?] | |
| [Receive Timeout] | |
| [Send Xon/Xoff?] | |
| [Script filename] | |
| [Open mode] | accept |
| [Originate?] | no |
| [Dial string] | |
| [Dial time out] | |
| [Half duplex modem?] | |

where baud rate is the appropriate baud rate.

6. Press **GO**.

7. If you are using the Voice Processor Module to dial out, Dialing in progress displays in the upper left-hand corner of your screen until the telephone connection is complete. If your workstation cannot get through to the other computer, [Retry or Abort, default = Abort] displays. Type either retry or abort. If you want to retry, press **RETURN** and type the correct telephone number after the [Phone number, default = Previous number] option.

   If you are using the Voice Processor Module to receive a call, Accept incoming call displays in the upper left-hand corner of your screen until the telephone line has been connected.

8. If you are using a modem, dial the telephone number. (If necessary, refer to the modem manufacturer's manual.)

9. If you want to receive the file, follow the steps below in "Receiving the File." If you want to send the file, follow the steps in "Sending the File."

## Receiving The File

Use the following steps to set up your workstation before the file is sent to you from the other workstation.

1. Press **HELP** to see the available function key options.
2. To record (store) the file you are to receive, press **F6**. The File Recording option appears. (If you press the wrong function key, press **CANCEL** and then **F6**.)
3. In the highlighted bar across from Filename:, type the name of the file in which you will store the incoming data.
4. If the file name already exists, press **RETURN** and type either overwrite to write over the existing file or append if you want to append the new data to the end of the existing file.
5. Press **GO**. The upper left-hand corner of your screen displays Recording on File FileName, where FileName is the name of the file you specified.
6. The file sent to your workstation appears on your screen as it is recorded in the file.
7. To stop recording, press **F8**. The Recording on File FileName message disappears.
8. Press **FINISH** to exit from Basic ATE and return to the Context Manager or the Executive.

## Sending The File

1. First make sure the other computer is set up to receive the file. Press **F8** to close any recording file that may be open. (Nothing apparent happens when you press **F8**.)
2. Press **HELP** to see the available function key options.
3. Press **F7**. The File Transmit option appears. (If you press the wrong function key, press **CANCEL** and then **F7**.)
4. In the highlighted bar across from Filename:, type the name of the file you want to send.

5. Press **GO**. The file transfers to the other computer and your screen displays File Transfer Complete in the upper left-hand corner.

*Note:* *If at any time you want to cancel the transmission, press* **ACTION-CANCEL**.

6. Press **FINISH** to exit from Basic ATE and return to the Context Manager or the Executive.

# Application 2: Transferring Files Between Remote Compatible Workstations

For this application, set up your workstation in one of the following ways:

- Connect your workstation to a modem with a straight-through RS-232-C cable. Attach one end of the cable to the modem and the other end of the cable to communications channel B of your workstation.
- Go directly through the telephone line by using line 2 of the Voice Processor Module of your workstation.

*Note:* *If the two workstations are close enough, use a crossed RS-232-C cable connection. See your workstation hardware installation manual for more information about cables.*

1. Set up your modem and cable connections. Common settings for computers and modems are:

| Computer Connection | Modem Connection |
|---|---|
| 9600 baud | 2400 or 9600 baud |
| 7 data bits | 7 data bits |
| odd parity | odd parity |
| 1 stop bit | 1 stop bit |

Use these settings for this application, and make sure the other workstation (modem) also matches these settings. (See the applicable manufacturer's manual for your modem.)

2. Sign on to your workstation.

   Your workstation screen enters either the Context Manager or the Executive. If your workstation enters the Context Manager, continue with step 3. If your workstation enters the Executive, skip to step 4.

3. If you are accessing Basic ATE through the Context Manager, select Basic ATE from the Context Manager screen, and press **GO**.

4. Type

   Basic ATE

   or

   B A

   and press **RETURN**.

*Note:* *If you accidentally press* **GO** *instead of* **RETURN**, *Basic ATE starts running. Press* **FINISH** *to return to the Executive and start over. (See the* CTOS Executive User's Guide *for more details.)*

5. The Basic ATE command form appears on your screen. Four different setups are possible for this application, each shown below in the example command forms. Type the correct options for your setup, using **RETURN** or the up-arrow and down-arrow keys to move the cursor from option to option.

If you are using a straight-through RS-232-C cable connection, use the values shown below.

| Basic ATE | |
|---|---|
| [Recording filename] | |
| [Comm channel] | [comm]b |
| [Baud rate] | 9600 |
| [Stop bits] | 1 |
| [Parity] | odd |
| [Data bits] | 7 |
| [Display mode] | hdx |
| [Auto linefeed?] | |
| [Recognize escape code?] | |
| [Receive Timeout] | |
| [Send Xon/Xoff?] | |
| [Script filename] | |
| [Open mode] | |
| [Originate?] | |
| [Dial string] | |
| [Dial time out] | |
| [Half duplex modem?] | |

If you are using a modem, use the values shown below.

| Basic ATE | |
|---|---|
| [Recording filename] | |
| [Comm channel] | [comm]b |
| [Baud rate] | baud rate |
| [Stop bits] | 1 |
| [Parity] | odd |
| [Data bits] | 7 |
| [Display mode] | hdx |
| [Auto linefeed?] | |
| [Recognize escape code?] | |
| [Receive Timeout] | |
| [Send Xon/Xoff?] | |
| [Script filename] | |
| [Open mode] | |
| [Originate?] | |
| [Dial string] | |
| [Dial time out] | |
| [Half duplex modem?] | |

where baud rate is the appropriate baud rate.

If you are using the Voice Processor Module to dial a call, use the values shown below.

| Basic ATE | |
|---|---|
| [Recording filename] | |
| [Comm channel] | [phone]2 |
| [Baud rate] | baud rate |
| [Stop bits] | 1 |
| [Parity] | odd |
| [Data bits] | 7 |
| [Display mode] | hdx |
| [Auto linefeed?] | |
| [Recognize escape code?] | |
| [Receive Timeout] | |
| [Send Xon/Xoff?] | |
| [Script filename] | |
| [Open mode] | dial |
| [Originate?] | yes |
| [Dial string] | telephone number |
| [Dial time out] | |
| [Half duplex modem?] | |

where baud rate is the appropriate baud rate, and telephone number is the appropriate telephone number. When specifying a telephone number, include an equals sign if your workstation needs to wait for a dial tone before dialing the number. (For example, 9=767-1111 means that your workstation sends 9, waits for the dial tone, then sends the rest of the number.) See your modem manual for more information.

If you are using the Voice Processor Module to receive a call, use the values shown below.

| Basic ATE | |
|---|---|
| [Recording filename] | |
| [Comm channel] | [phone]2 |
| [Baud rate] | baud rate |
| [Stop bits] | 1 |
| [Parity] | odd |
| [Data bits] | 7 |
| [Display mode] | hdx |
| [Auto linefeed?] | |
| [Recognize escape code?] | |
| [Receive Timeout] | |
| [Send Xon/Xoff?] | |
| [Script filename] | |
| [Open mode] | accept |
| [Originate?] | no |
| [Dial string] | |
| [Dial time out] | |
| [Half duplex modem?] | |

where baud rate is the appropriate baud rate.

6. Press **GO**.

7. If you are using the Voice Processor Module to dial out, Dialing in progress displays in the upper left-hand corner of your screen until the telephone connection is complete. If your workstation cannot get through to the other computer, [Retry or Abort, default = Abort] displays. Type either retry or abort. If you want to retry, press **RETURN** and type the correct telephone number after the [Phone number, default = Previous number] option.

   If you are using the Voice Processor Module to receive a call, Accept incoming call displays in the upper left-hand corner of your screen until the telephone line has been connected.

8. If you are using a modem, dial the telephone number. (If necessary, refer to the modem manufacturer's manual.)

9. If you want to receive the file, follow the steps below in "Receiving the File." If you want to send the file, follow the steps in "Sending the File."

## Receiving The File

Use the following steps to set up your workstation before the file is sent to you from the other workstation.

1. Make sure the other workstation has specified that it is transmitting the file with the same setup as your workstation.
2. Press **HELP** to see the available function key options.
3. Press **F4**. The File Transfer In option appears on the screen. (If you press the wrong function key, press **CANCEL** and then **F4**.)
4. In the highlighted bar across from Filename:, type the name of the file in which you will store the incoming data.
5. If the file name already exists, press **RETURN** and type either overwrite to write over the existing file or append if you want to append the new data to the end of the existing file.
6. Press **GO**. The upper left-hand corner of the screen displays Waiting for Transmitter to Start Transmission. This means that Basic ATE is waiting for the other workstation to start sending the file. After the other workstation starts sending the file, your screen displays how much of the file has been received (in blocks). Wait until you receive a message telling you that reception is complete.

*Note:* *If at any time you want to cancel the transmission, press* **ACTION-CANCEL.**

7. Press **FINISH** to exit from Basic ATE and return to the Context Manager or the Executive.

## Sending The File

1. First make sure the other workstation is set up to receive the file.
2. Press **HELP** to see the available function key options.
3. Press **F5**. The File Transfer Out option appears. (If you press the wrong function key, press **CANCEL** and then **F5**.)
4. In the highlighted bar across from Filename:, type the name of the file you want to send.

5. If you want to send a message before you send the file, press **RETURN** until [First record text (default is none)] is highlighted; then type the message. For example:

   Here comes my last updated section. Let me know how it is!

6. You can send up to 70 characters in this kind of message.
7. Press **GO**. The upper left-hand corner of the screen displays how much of the file has been transferred (by blocks). Wait until you receive a message telling you that the transfer is complete.

*Note:* *If at any time you want to cancel the transmission, press* **ACTION-CANCEL**.

8. Press **FINISH** to exit from Basic ATE and return to the Context Manager or the Executive.

# Application 3: Accessing a Wire Service

For this application, you can set up your workstation in one of the following ways:

- Connect your workstation to a modem with a straight-through RS-232-C cable. Attach one end of the cable to the modem and the other end of the cable to one of the communications channels of your workstation – in this case, channel B.
- Go directly through the telephone line by using line 2 of the Voice Processor Module of your workstation.

1. Set up your modem connection. Common modem settings are as follows:

   **Modem Connection**

   2400 or 9600 baud

   7 data bits

   odd parity

   1 stop bit

   Make sure your modem settings match these values. (See your modem manufacturer's manual.)

2. Sign on to your workstation.

   Your workstation screen enters either the Context Manager or the Executive. If your workstation enters the Context Manager, continue with step 3. If your workstation enters the Executive, go to step 4.

3. If you are accessing Basic ATE through the Context Manager, select Basic ATE from the Context Manager screen, and press **GO**. Go to step 5.

4. If you are accessing Basic ATE through the Executive, type

   Basic ATE

   or

   B A

   and press **RETURN**.

   ***Note:*** *If you accidentally press* **GO** *instead of* **RETURN**, *Basic ATE starts running. Press* **FINISH** *to return to the Executive and start over. (See the* CTOS Executive User's Guide *for more details.)*

5. The Basic ATE command form appears on your screen. The list of options in the command form for each type of setup are shown below in the example command forms. Type the correct options for your setup, using the **RETURN** key or the up-arrow and down-arrow keys to move the cursor from option to option.

If you are using a straight-through RS-232-C cable connection, use the values shown below.

| Basic ATE | |
|---|---|
| [Recording filename] | |
| [Comm channel] | [phone]2 |
| [Baud rate] | |
| [Stop bits] | 1 |
| [Parity] | odd |
| [Data bits] | 7 |
| [Display mode] | |
| [Auto linefeed?] | |
| [Recognize escape code?] | |
| [Receive Timeout] | |
| [Send Xon/Xoff?] | |
| [Script filename] | |
| [Open mode] | dial |
| [Originate?] | yes |
| [Dial string] | telephone number |
| [Dial time out] | |
| [Half duplex modem?] | |

where telephone number is the appropriate telephone number. When specifying a telephone number, include an equals sign if your workstation needs to wait for a dial tone before dialing the number. (For example, 9=767-1111 means that your workstation sends 9, waits for the dial tone, then sends the rest of the number.) See your modem manual for more information.

If you are using the Voice Processor Module modem, use the values shown below.

| Basic ATE | |
|---|---|
| [Recording filename] | |
| [Comm channel] | [comm]b |
| [Baud rate] | baud rate |
| [Stop bits] | 1 |
| [Parity] | odd |
| [Data bits] | 7 |
| [Display mode] | |
| [Auto linefeed?] | |
| [Recognize escape code?] | |
| [Receive Timeout] | |
| [Send Xon/Xoff?] | |
| [Script filename] | |
| [Open mode] | |
| [Originate?] | |
| [Dial string] | telephone number |
| [Dial time out] | |
| [Half duplex modem?] | |

where baud rate is the appropriate baud rate, and telephone number is the appropriate telephone number. When specifying a telephone number, include an equals sign if your workstation needs to wait for a dial tone before dialing the number. (For example, 9=767-1111 means that your workstation sends 9, waits for the dial tone, then sends the rest of the number.) See your modem manual for more information.

6. Press **GO**.
7. If you are using the Voice Processor Module to dial out, Dialing in progress appears in the upper left-hand corner of your screen until the telephone connection is complete. If your workstation cannot get through the telephone network, [Retry or Abort, default = Abort] appears. Type either **retry** or **abort**. If you want to retry, press **RETURN** and type the correct telephone number after the [Phone number, default = Previous number] option.
8. If you are using a modem, dial the telephone number. (See your modem manufacturer's manual for more information.)

9. Sign on to your wire service. When you are done, log off of the wire service.
10. Press **FINISH** to exit from Basic ATE and go back to the Context Manager or the Executive.

# Application 4: Troubleshooting a Serial Printer

For this example, your workstation is connected to the printer by a crossed RS-232-C cable. Attach one end of the cable to the printer and the other end of the cable to one of the communications channels of your workstation – in this case, channel B.

***Note:*** *If the print spooler is installed, deinstall it before you run* Basic ATE. *See your system administrator for details.*

1. Turn the printer on and run the self-test. (Refer to the printer manufacturer's manual.)
2. Most serial printers are set as follows:

   1200 baud

   7 data bits

   even parity

   1 stop bit

   Check that the printer switch settings match these values. If not, change the values in the following steps to match those of the printer.
3. Sign on to your workstation.

   Your workstation screen enters either the Context Manager or the Executive. If your workstation enters the Context Manager, continue with step 4. If your workstation enters the Executive, go to step 5.
4. If you are accessing Basic ATE through the Context Manager, select Basic ATE from the Context Manager screen, and press **GO**. Go to step 6.

5. If you are accessing Basic ATE through the Executive, type

   Basic ATE

   or

   B A

   and press **RETURN**.

*Note:* *If you accidentally press* **GO** *instead of* **RETURN**, Basic ATE *starts running. Press* **FINISH** *to return to the Executive and start over. (See the* CTOS Executive User's Guide *for more details.)*

6. The Basic ATE command form appears on your screen. The options in the command form are shown below. Type the correct options by using the **RETURN** key or the **up-arrow** and **down-arrow** keys to move the cursor from option to option.

```
Basic ATE
[Recording filename]
[Comm channel]          [comm]b
[Baud rate]             1200
[Stop bits]             1
[Parity]                even
[Data bits]             7
[Display mode]          hdx
[Auto linefeed?]
[Recognize escape code?]
[Receive Timeout]
[Send Xon/Xoff?]
[Script filename]
[Open mode]
[Originate?]
[Dial string]
[Dial time out]
[Half duplex modem?]
```

   If the printer switch settings differ from these values, change these values to reflect the differences.

7. Press **GO**.

8. Type some characters from your keyboard. If the characters do not print correctly, continue with the next step.
9. Try a different RS-232-C cable; your cable may be the wrong type or may not be working properly. Repeat steps 1 through 5. If the characters still do not print correctly, continue with the next step.
10. Connect the cable to channel A instead of channel B. Repeat steps 1 through 5, but change the [comm]b option to [comm]a. If the characters print correctly, you have a bad channel B port (communications connector). If the characters do not print correctly, continue with the next step.
11. Check the printer switches again to make sure the settings match those in step 2. If they don't match, change the option values. (For example, if the printer baud rate is 9600, type **9600** as the [Baud rate] option instead of 1200.) Then, repeat steps 1 through 5, above. If the characters still do not print correctly, continue with the next step.
12. Again, make sure the spooler is not installed at your workstation. If the characters still do not print correctly, ask your system administrator for help.

# Section 2
# A Closer Look at Basic ATE

## Introduction

This section describes Basic ATE in detail. It defines Basic ATE, explains how to run and alter Basic ATE, and covers what you see before, during, and after running Basic ATE. In addition, this section examines function keys you can use to interrupt Basic ATE at any time.

The following topics are covered:

- Basic ATE capabilities
- The Basic ATE Command form
- The Basic ATE run screen
- The Basic ATE function keys
- How to interrupt Basic ATE
- ASCII control characters

## Basic ATE Capabilities

Basic ATE allows you to transfer information between your workstation and any other computer terminal that has a Basic ATE feature. To do this, Basic ATE internally converts all of the letters or numbers it sends or receives into a code that most computer systems can accept. This code is called ASCII, for American Standard Code for Information Interchange. (See Appendix A, "Basic ATE Line Control and ASCII Codes," for ASCII code information.)

The name Basic Asynchronous Terminal Emulator (Basic ATE) means that your workstation transmits each coded character one at a time to a receiving workstation. Because the transmission does not depend upon any internal clocks, it can occur at any time (that is, asynchronously).

Each character you type is immediately transmitted to the other computer. Likewise, each character your workstation receives from the other computer displays immediately on your video screen. In addition, your workstation can send or receive entire files in the same manner.

Basic ATE causes your workstation to emulate (act like) an asynchronous (immediate transmission) terminal (workstation). This means you can communicate with other computers through Basic ATE and actually use applications running on these computers from your workstation.

In addition to displaying the characters on your video screen, Basic ATE can record (store) received characters in a file for later reviewing, editing, or printing.

## Basic ATE Command Form

You access the Basic ATE command form just as you would any other command form, through either the Context Manager or the Executive.

Sign on to your workstation.

Your workstation screen enters either the Context Manager or the Executive. If your workstation enters the Context Manager, continue with step 2. If your workstation enters the Executive, skip to step 3.

If you are accessing Basic ATE through the Context Manager, select Basic ATE from the Context Manager screen, and press **GO**. (See your Context Manager Manual for more details.) Go to step 4.

If you are accessing Basic ATE through the Executive, type

Basic ATE

or

B A

and press **RETURN**.

***Note:*** *If you accidentally press* **GO** *instead of* **RETURN**, *Basic ATE starts running. Press* **FINISH** *to return to the Executive and start over. (See the* CTOS Executive User's Guide *for more details.)*

## Command Form

Basic Asynchronous Terminal Emulator

| | |
|---|---|
| [Recording filename] | _____ |
| [Comm channel] | _____ |
| [Baud rate] | _____ |
| [Stop bits] | _____ |
| [Parity] | _____ |
| [Data bits] | _____ |
| [Display mode] | _____ |
| [Auto linefeed?] | _____ |
| [Recognize escape code?] | _____ |
| [Receive Timeout] | _____ |
| [Send Xon/Xoff?] | _____ |
| [Script filename] | _____ |
| [Open mode] | _____ |
| [Originate?] | _____ |
| [Dial string] | _____ |
| [Dial timeout] | _____ |
| [Half duplex modem?] | _____ |

Bracketed items on the left side of the command form are called parameter prompts. Lines on the right side of the command form are called parameter fields.

Brackets around a parameter prompt mean that the parameter is optional. If you do not specify a value, Basic ATE uses the default value. A default value is a predetermined value that is used automatically when you do not enter a selection in the parameter field. The command options and defaults are described below.

When filling in the command form, press **RETURN**, **TAB**, or down-arrow to advance to the next parameter field. To go back to a previous field, press up-arrow.

## Parameter Fields

### *[Recording filename]*

Default: No recording file

This option specifies a file into which each character is recorded as it is transferred.

If an existing file has the same name as the recording file you select, Basic ATE appends the new data to the file's previous contents. Otherwise, Basic ATE creates a new file.

If you do not enter a response, incoming or outgoing characters are not placed in a file.

### *[Comm channel]*

Default: [Comm] B

The communications channels use either a serial RS-232-C cable or the telephone line and include many different options depending upon the type and configuration of your workstation. Refer to "Setting Up Your Workstation" in Section 1 if you do not know your workstation configuration.

With a serial RS-232-C cable, the option includes a device, a module, and a channel. The device is [Comm] (for a local workstation). If you connected the cable to a processor module, you do not have to specify a module number. If you are using a Port Expansion Module, however, you must specify a single digit (1 or 2) for the module you select. The channel is identified by a letter (A, B, C, or D) specifying which channel of the selected module you are using.

For example, [Comm]B indicates channel B of the workstation Processor Module. [Comm]1A indicates the first channel of the first Port Expansion Module (DCX or XC-002).

You can include a node name, such as [NodeName][Comm]B (where NodeName is the name of the node). (Refer to the CTOS Executive User's Guide.)

If you are using the telephone line through the Voice Processor Module, the option includes a device, a module, and a line.

If you do not enter a response, Basic ATE uses communications channel B.

*[Baud rate]* Use "19.2" for 19200

Default: 9600 or 1200/300

This option specifies your transmission speed from 20 to 19200 baud. Common baud rates are 110, 150, 300, 1200, 2400, 4800, 9600, and 19200.

The Voice Processor Module uses only 300 and 1200 baud.

The [Baud rate] parameter field has two baud rate defaults that accommodate each workstation configuration.

The default for a standard modem is 9600 baud. Therefore, if you do not enter a response, Basic ATE selects a transmission speed of 9600 baud.

When you are using your Voice Processor Module in answer mode (described in the [Originate] option), Basic ATE tries to receive the data at 1200 baud first, then 300 baud to match the caller's baud rate. When you are in originate mode, you must specify the baud rate.

*[Stop bits]*

Default: 1

This option specifies the number of stop bits for each character.

You can enter either 1 or 2. Usually, 2 stop bits are used at the 110 baud rate and 1 stop bit at the other common baud rates described in the [Baud rate] option.

The default is 1. If you do not enter a response, Basic ATE selects 1 stop bit per character.

*[Parity]*

Default: 0

This option specifies whether parity is none, even, odd, 0, or 1.

None signifies that no parity bits are used. You can specify none only when you specify 8 for the [Data bits (5, 6, 7, or 8; default = 7)] option.

Even signifies that bit 7 is set or cleared so that there is always an even number of bits set in each type.

Odd signifies that bit 7 is set or cleared so that there are always an odd number of bits set in each byte.

0 signifies that bit 7 is always cleared.

1 signifies that bit 7 is always set.

The default is 0. If you do not enter a response, Basic ATE selects 0 parity.

***[Data Bits]***

Default: 7

This option specifies the number of data bits for each character.

You can enter either 5, 6, 7, or 8.

If even, odd, 0, or 1 parity is specified, the [Data bits] option does not include the parity bit. Since ASCII encoding is always used, 7 bits with even, odd, 0, or 1 parity is normally used.

The default is 7. If you do not enter a response, Basic ATE selects 7 data bits per character.

***[Display mode]***

Default: fdx

This option specifies how you transfer information and how you see the information displayed on your screen.

The display modes are full duplex (fdx), half duplex (hdx), echoplex, and hexadecimal (hex). In all display modes, characters that are typed at your keyboard are transmitted and received at another computer.

In full duplex mode, data can flow in two directions simultaneously. The characters do not appear on the screen of the transmitting computer as they are typed. For example, when you send data in full duplex mode, your video screen does not display the data as it is transmitted to the other computer.

In half duplex mode, data can flow in only one direction at any given time. The characters display on the screen of the transmitting computer as they are typed. For example, when you send data in this mode, your video screen also displays the data as it is transmitted. Note, however, that the data you see on the video screen does not signify that the other computer has received the data.

In echoplex mode, characters that are received at the computer that specified echoplex are echoed (displayed) back to the transmitter's screen. For example, if you specify echoplex at your workstation and then send data to another computer, your video screen does not display the data; however, when the other computer transmits data to you, your workstation echoes that data back to the other computer.

In hexadecimal mode, communications are in full duplex, and received characters display as two-digit hexadecimal numbers rather than as characters.

The default is fdx. If you do not enter a response, Basic ATE selects the full duplex display mode.

***[Auto linefeed?]***

Default: No

This option specifies the way carriage returns and line feeds embedded in incoming data are treated. Yes specifies that any incoming carriage return (CR) positions the cursor in the first column of the next line, and that all line feeds (LFs) are ignored.

The default is no. If you do not enter a response, an incoming CR positions the cursor in the first column of the present line, and an LF positions the cursor in the current column of the next line.

*[Recognize escape code?]*

Default: No

This option specifies the way incoming ASCII ESC (escape) characters (1Bh) are mapped.

When you specify yes for this field, Basic ATE changes all incoming 1Bh characters to 0FFh characters before writing them to the video display using the Sequential Access Method (SAM). This permits computers that are able to generate only 7-bit codes to access your workstation's video facilities.

The default is no. If you do not enter a response, Basic ATE does not change incoming ASCII ESC characters.

*[Receive timeout]*

Default: None

This option specifies the maximum time allowed to receive a data transmission before Basic ATE issues a timeout error. For example, if you specify 2 seconds, Basic ATE waits to receive data for 2 seconds before issuing a timeout error.

The default is no timeout. If you do not enter a response, Basic ATE does not issue a timeout error.

*[send Xon/Xoff?]*

Default: No

The Xon/Xoff protocol is a means of determining when to stop and begin data transmission. For example, if you are sending information from your workstation to another device that uses Xon/Xoff, the other device sends Xoff when it cannot process any more data. At this time, your workstation stops transmitting data until it receives Xon. When it receives the Xon signal, it can continue sending the transmission without losing data.

Xon/Xoff is typically used by slow devices that cannot process information as quickly as your workstation can. If a slow device does not use Xon/Xoff, it may not be able to process all of the information, and data may be lost.

Enter yes to use the Xon/Xoff protocol.

The default is no. If you do not enter a response, the Xon/Xoff protocol is not used.

*[Script filename]*

Default: No script file

This option specifies a file used by Basic ATE to handshake with another workstation or computer system.

A script file, which is also known as a command list, can be used to perform an automatic sign-on sequence that connects your workstation to a remote host computer as follows:

| Host System Asks | Your Workstation Responds |
|---|---|
| Enter ID | Joe |
| Enter password | 1234876 |
| ! | Stock Quote |

In this example, your workstation waits for the correct prompts and provides the correct replies to gain access to stock quotes. To accomplish this, you simply type the name of your script file.

You create the script file in the Editor by using designated words. These are described in Section 3, "Creating a Script File."

If you do not enter a response, no script file is used.

*[Open mode]*

Default: Dial

Basic ATE recognizes the [Open mode] option only when the Voice Processor Module modem is specified in the [Comm channel] option.

Enter Dial to make an outgoing call using the dial string described in the [Dial string] option. In this case, Dial causes the Voice Processor Module to take the telephone off hook and dial the string (telephone number).

Enter Accept to wait for an incoming call to occur. In this case, Accept tells your Voice Processor Module to wait for a ringing telephone line to accept the call.

Enter Convert to convert an existing voice call to a data call or vice versa. For example, if a voice call is in progress, Convert connects the Voice Processor Module modem to the telephone line and disconnects the telephone handset.

The default is dial. Enter no response to dial out.

***[Originate?]***

Default: Yes/No

Basic ATE recognizes this option only when you specify the Voice Processor Module modem in the [Comm channel] option.

When you initiate the call to another workstation, you are in originate mode because the transfer originates at your workstation. When you receive the call, you are in answer mode because your workstation is answering the call.

Enter yes to initiate the call and no to receive the call.

The computer at the other end of the telephone line must be in the opposite mode.

When your Voice Processor Module is in answer mode, it tries to receive the data at 1200 baud first, then 300 baud to match the caller's baud rate. When you are in originate mode, you must specify the baud rate (see [Baud rate]).

The default is yes if you choose Dial in the [Open mode] option. The default is no if you choose Accept in the [Open mode] option. Entering no response signifies you are in originate mode when dialing a call and answer mode when accepting a call.

***[Dial string]***

Default: No dial string

Basic ATE recognizes this option only when you specify the Voice Processor Module modem in the [Comm channel] option.

The [Dial string] option specifies the number that you are calling; it consists of the following:

- Normal characters on your telephone
- An equals sign (=) signifying to wait for dial tone
- A tilde (~) signifying to pause for the default pause time

For example, 9=555-1212 means that the Voice Processor Module modem waits for a dial tone, then dials 9, waits for a dial tone again and finally continues the dial string.

The default is no dial string. Entering no response means that you are not dialing out.

***[Dial timeout]***

Default: 32 seconds

This option allows you to change the length of the timeout. This option is useful if you want to connect with a computer service through the Voice Processor Module or modem. (You may need to change the length of the timeout for it to work correctly, and it may be necessary for you to experiment with the timeout length to get it correct.)

Timeout length is expressed in seconds. For example, if you want to designate a 2-minute timeout, specify 120.

***[Half duplex modem?]***

Default: No

If you enter yes to this option, Request to Send (RTS) is active only on character transmission.

If you enter no, RTS is active when you use RS-232 ports, which is the usual condition.

When you are finished filling in the command form, press **GO**.

# Basic ATE Run Screen

When Basic ATE runs, it is in emulation mode because it is emulating, or acting like, an asynchronous terminal. An asynchronous terminal is a terminal that accepts characters at any time in ASCII format.

To observe Basic ATE while it is running, press **GO.**

When you see Basic ATE running, you can note the following features on the screen (shown in Figure 2-1):

- At the top of the screen, two lines of text appear in the area above the double bars. This area is called the Status frame, and the information it displays is constantly changing. The Status frame conveys important information about Basic ATE.
- The area below the Status frame is called the interactive window because it acts like a window that changes in response both to Basic ATE and to your commands. When Basic ATE is running in emulation mode, you observe it through the interactive window.

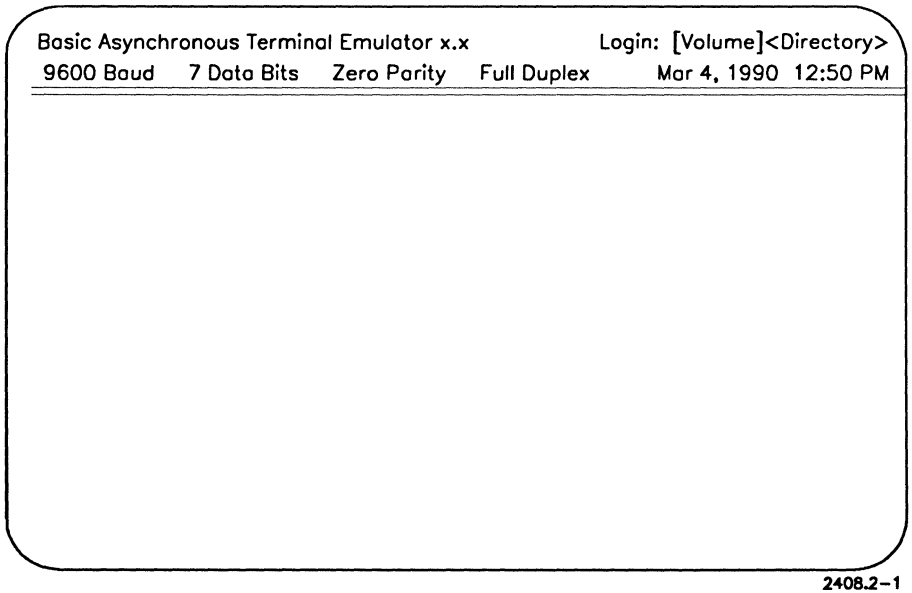



**Figure 2-1. Basic ATE Screen**

## Status Frame

The Status frame shows the current settings of the communications parameters, such as baud rate, parity, number of data bits, record/transmit status, and record/transmit file.

As shown in Figure 2-1, the top line of the Status frame displays:

- The name "Basic Asynchronous Terminal Emulator" and its version
- The volume and directory names you used to sign on

The bottom line of the Status frame displays:

- The baud rate you are using
- How many data bits you are using to communicate
- The type of parity checking you are using
- The display mode you are using
- The current date and time

The bottom line of the Status frame constantly changes as you change options. Status information also displays on this line.

For example, if you press **GO** without filling in any of the parameter fields, Basic ATE runs using all of its defaults. You see 9600 baud, 7 data bits, zero parity, and full duplex. If you enter a recording file as an option, you see the message Recording on file, followed by the name of the file you specified.

## Interactive Window

Everything that Basic ATE does appears in the interactive window. For example, the HELP function displays in this area, or, if you are using Basic ATE to pipe characters from your workstation to a foreign computer (such as an IBM PC compatible), the characters display as they are transferred.

# Basic ATE Function Keys

Suppose that while you are running Basic ATE, you decide to change an option. What do you do? Finish and start over? No; simply press **HELP** to display a list of the available functions (and their corresponding keys) that allow you to make modifications. When you press a function key, Basic ATE temporarily exits from the emulation mode so you can make your changes.

When you press **HELP**, the following displays:

Available functions are:

| | |
|---|---|
| F1 | Change Baud Rate |
| F2 | Change Communications Options |
| F3 | Change Display Mode |
| F4 | File Transfer In |
| F5 | File Transfer Out |
| F6 | File Recording |
| F7 | File Transmit |
| F8 | Close Recording File |
| F9 | Data/Voice Mode Convert |
| F10 | Workstation Keyboard for SRP Debugging |
| FINISH | Exit |

When you press a function key, a command form for that function appears in the interactive window. Fill in the options, and press **GO**. Basic ATE then returns to emulation mode.

If you accidentally press the wrong function key, press **CANCEL** to get back into emulation mode.

The various function keys are described in the following sections.

## Change Baud Rate (F1)

The Change Baud Rate function allows you to change the baud rate and number of stop bits.

For example, if the other device runs at 1200 baud and your workstation is set at 9600 baud, you can change your baud rate by using this function.

## Command Form

Change Baud Rate
[Baud Rate (20-19200, default = previous value)] _____
[Stop Bits (1 or 2;default = previous value)] _____

## Parameter Fields

USE "19.2" FOR 1920 0

***[Baud rate (20-19200; default = previous value)]***

This option changes the baud rate to a specified value from 20 to 19200 baud.

The default is the previous value for this option. If you do not enter a response, Basic ATE selects the baud rate that was used for the previous data transfer.

***[Stop Bits (1 or 2; default = previous value)]***

This option changes the stop bits value for each character to 1 or 2.

Usually 2 stop bits are used at the 110 baud rate and 1 stop bit is used at the other common baud rates.

The default is the previous value for this option. If you do not enter a response, Basic ATE selects the stop bits value that was used for the previous data transfer.

## Change Communications Options (F2)

The Change Communications Options function allows you to change the number of data bits per character and the type of parity.

For example, if the other device uses even parity and your workstation is set at zero parity, you change your parity mode by using this function.

## Command Form

Change Communications Options
[Data Bits (5-8;, default = previous value)] _____
[Parity (none, even, odd, 0, or 1;
default = previous value)] _____

## Parameter Fields

***[Data Bits (5-8; default = previous value)]***

This option changes the number of data bits used per character to 5, 6, 7, or 8.

The number of data bits per character does not include the parity bit if even, odd, 0, or 1 parity is specified. The parity bit is in addition to the number of data bits specified. For example, if you specify 8 bits and odd parity, 9 bits are transmitted for each byte of data: the 8 data bits and 1 parity bit. Since ASCII encoding is always used, 7 bits with even, odd, 0, or 1 parity are normally used.

The default is the previous value for this option. If you do not enter a response, Basic ATE selects the previous value used for the number of data bits per character.

***[Parity (none, even, odd, 0, or 1; default = previous value)]***

This option changes the parity used to none, even, odd, 0, or 1.

None signifies no parity bits are used.

Even signifies that bit 7 is set or cleared so that there are always an even number of bits set in each byte.

Odd signifies that bit 7 is set or cleared so that there are always an odd number of bits set in each byte.

0 signifies that bit 7 is always cleared.

1 signifies that bit 7 is always set.

When you specify 8 in the [Data bits (5, 6, 7, or 8; default = 7)] option, you must specify none for Parity.

The default is the previous value for this option. If you do not enter a response, Basic ATE selects the parity value that was used for the previous data transfer.

## Change Display Mode (F3)

The Change Display Mode function allows you to change the display mode, which determines how data flows and what appears on your screen during data transfers.

For example, suppose you are using half duplex data flow; this mode allows data to flow only in one direction at a time. If you want to use the optimum form of data flow, change the display mode to full duplex. This mode allows data to be sent and received simultaneously.

## Command Form

```
Change Display Mode
   [Display mode (fdx, hdx, echoplex, or hex;
    default = previous value)]
```

## Parameter Fields

***[Display mode (fdx, hdx, echoplex, or hex; default = previous value)]***

This option changes the display mode.

The display modes are full duplex (fdx), half duplex (hdx), echoplex, and hexadecimal (hex). In all display modes, characters that are typed at your keyboard are transmitted and received at another computer.

In full duplex mode, data can flow in two directions simultaneously. The characters do not appear on the screen of the transmitting computer as they are typed. For example, when you send data in full duplex mode, your video screen does not display the data as it is transmitted to the other computer.

In half duplex mode, data can flow in only one direction at a given time. The characters display on the screen of the transmitting computer as they are typed. For example, when you send data in half duplex mode, your video screen also displays the data as it is transmitted. Note, however, that the data you see on the video screen does not signify that the other computer has received the data.

In echoplex mode, characters that are received by the computer that specified echoplex mode are echoed (displayed) back to the transmitter's screen. For example, if you specify echoplex at your workstation and then send data to another computer, your video screen does not display the data; however, when the other computer transmits data to you, your workstation echoes back the data to the other computer.

In hexadecimal mode, communications are in full duplex, and received characters display as two-digit hexadecimal numbers rather than as characters.

The default is the previous value for this option. If you do not enter a response, Basic ATE selects the display mode used for the previous data transfer.

## File Transfer In (F4)

The File Transfer In function allows you to create a file or use an existing file to record (that is, store) incoming data. Use the File Transfer In function in conjunction with the File Transfer Out function key (**F5**) only if both workstations are compatible. In addition, make sure all of the options are set for compatibility. If the workstations are not compatible, use the File Recording (**F6**) and the File Transmit (**F7**) functions.

With the File Transfer In function, Basic ATE creates a new file if one doesn't already exist. If a file already exists, you can specify either to replace the contents of the file or append data to the end.

After you press **GO**, Basic ATE opens the file and begins the transfer. After completing the transfer, Basic ATE closes the file and returns to normal operation. To request a premature termination of the transmission, press **ACTION-CANCEL**.

File Transfer mode uses a protocol that sends an acknowledgment (ACK) character in response to a correctly received record, or a negative acknowledgment (NAK) character in response to a record received with errors. See "File Transfer Out" later in this section for proper operation, and Section 4, "Basic ATE Protocols," for additional information.

## Command Form

File Transfer In
Filename: _____
[File transfer mode (ASCII or binary;
default = ASCII)] _____
[File input mode (overwrite or append;
default = append)] _____
[CR/LF mapping mode (binary or new line;
default = new line)] _____

## Parameter Fields

### *Filename*

This option specifies the name of the file in which you record (store) the incoming data. A new file is created if one does not exist. If a file already exists, you elect to replace the existing file or append the incoming data to the existing file by using the following options.

When Basic ATE runs, it displays Waiting for Transmitter to Send Starting Character in the Status frame.

The Filename option has no default. If you do not specify a file name, the keyboard beeps and displays No File Name Specified, Transfer Not Started in the Status frame of your screen. In addition, Basic ATE returns to emulation mode. Press F4 and start over. This time, be sure to specify a file name.

### *[File transfer mode (ASCII or binary; default = ASCII)]*

This option specifies the method of file transfer.

Binary transfer uses a byte count and checksum in each record, and is therefore more reliable than ASCII transfer. You cannot transfer 8-bit data (such as object modules) with ASCII transfer mode.

Binary mode is the most flexible and reliable means of transmitting data between compatible workstations. Specify 8 data bits and no parity.

The default is ASCII mode. If you do not enter a response, Basic ATE selects the ASCII transfer mode.

*[File input mode (overwrite or append; default = append)]*

This option specifies whether the new file replaces the existing file or appends it.

The default is append. Entering no response causes the new file to be appended to the existing file.

*[CR/LF mapping mode (binary or new line; default = new line)]*

This option selects how to map incoming carriage returns (CRs) and line feeds (LFs).

The binary option copies all characters to the destination file of your workstation exactly as they are received.

The new line option maps all received CRs and LFs to the destination file of your workstation's RETURNs (0Ah) according to the following algorithm. A single CR, a single LF, or a CR/LF combination maps into a single RETURN at your workstation.

If you do not specify the binary or new line option, the [CR/LF mapping mode (binary or new line; default = new line)] mode defaults to the new line mapping option.

## File Transfer Out (F5)

The File Transfer Out function transfers a file to another compatible workstation. Use it in conjunction with the File Transfer In function key (**F4**) only if the workstations are compatible. In addition, make sure all of the options are set for compatibility. If the workstations are not compatible, use the File Recording (**F6**) and File Transmit (**F7**) function keys.

After you press **GO**, Basic ATE transfers the file. Before the transfer, Basic ATE transmits an ASCII STX (start-of-text, 02h) and then begins sending blocks of text. After completing the transfer, Basic ATE transmits an ASCII ETX (end-of-text, 03h) character, closes the file, and returns to normal operation.

To request a premature termination of the transmission, press **ACTION-CANCEL**.

The File Transfer Out mode of operation uses a protocol with positive acknowledgment; that is, a protocol that sends an acknowledgment (ACK) character in response to a correctly received record, or a negative acknowledgment (NAK) character in response to a record received with errors. See "File Transfer In" for proper operation, and Section 4, "Basic ATE Protocols," for additional information.

## Command Form

File Transfer Out
Filename: _____
[File transfer mode (ASCII or binary; default = ASCII)] _____
[New line mapping mode (binary, CR, or CRLF; default = CRLF)] _____
[First record text (default is none)] _____
[Wait for initial acknowledgment? (default = Yes)] _____
[ACK character (default = 06H)] _____
[Delay before transmit in milli sec; (default = none)] _____
[ACK usage? (default = Yes)] _____
[Retransmit line if receive non ACK char.? (default = Yes)] _____
[Block begin character;(default = STX;02H)] _____
[Block end character;(default = ETX;03H)] _____
[End of text character; (default = EOT;04H)] _____

## Parameter Fields

### *Filename*

This option defines the file you are sending.

When Basic ATE runs, the Status frame displays the number of blocks that are transferred. At the end of the transfer, the Status frame displays File Transfer Complete. (For Basic ATE, a block is a 128-byte or less grouping of characters.)

There is no default for this option. If you do not specify a file name, the keyboard beeps and displays No File Name Specified, Transfer Not Started in the Status frame of your screen. In addition, Basic ATE returns to emulation mode. Press **F5** and start over.

*[File transfer mode (ASCII or binary; default = ASCII)]*

This option specifies the method of file transfer.

Binary transfer uses a byte count and checksum in each record and is therefore more reliable than ASCII transfer. You cannot transfer 8-bit data (such as object modules) with ASCII transfer mode.

Binary mode is the most flexible and reliable means of transmitting data between compatible workstations. Specify 8 data bits and no parity.

The default is ASCII mode. If you do not enter a response, Basic ATE selects the ASCII transfer mode.

*[New line mapping mode (binary, CR, or CRLF; default = CRLF)]*

This option selects how to map incoming carriage returns (CRs) and line feeds (LFs).

The binary option transfers the file exactly as it is. With this option, Basic ATE can transfer binary data.

The CR option replaces all of your workstation's RETURNs (0Ahs) with ASCII CRs (0Dhs) before it transmits a file. With the CR option, Basic ATE emulates an ASCII terminal.

The CRLF option replaces all of your workstation's RETURNs (0Ahs) with ASCII CR/LF character pairs (0Dh/0Ah) before transmitting a file. With the CRLF option, Basic ATE emulates a host computer by transmitting the CRLF combination.

The default is CRLF. If you do not enter a response, Basic ATE selects the CRLF mapping mode.

*[First record text (default is none)]*

This option allows you to send up to 70 characters of text before the first record of the file is transmitted. For example, you can type a message such as, "Here comes my most recent updated section!" in the highlighted bar. When Basic ATE sends the file to the other workstation, this message displays first.

The default is no text. Entering no response causes no data record (text) to precede the transmission of the first record of the specified file.

*[Wait for initial acknowledgment? (default is yes)]*

This option signifies that Basic ATE waits for an initial acknowledgment from the receiver before it starts transmitting data. If your workstation does not receive an initial acknowledgment from the receiver, Basic ATE displays Waiting for Receiver to ACKnowledge the Starting Character in the Status frame.

The starting character is the initial acknowledgment and can be any ASCII number.

The default is yes. Entering no response signifies that your workstation waits for an initial acknowledgment from the receiver before it starts transmitting data.

*[ACK character (default = 06H)]*

This option assigns an ASCII number to represent ACK for using the positive acknowledgment protocol between workstations.

The File Transfer Out (**F5**) function operates using a protocol with positive acknowledgment. Positive acknowledgment sends an acknowledgment (ACK) character in response to a correctly received record, or a negative acknowledgment (NAK) character in response to a record received with errors. The [ACK character (default = *06H)]* option assigns an ASCII number to represent ACK.

The default is 06h. If you do not enter a response, Basic ATE assigns 06h as the ASCII number for ACK.

*[Delay before transmit in milli sec; (default = none)]*

This option allows your workstation to delay before transmitting data.

For example, if the receiving computer system is slow, you may want to delay your data transmission until the other computer system has had time to process information and return data.

The default is no delay. If you do not enter a response, there is no delay.

*[ACK usage? (default = Yes)]*

This option determines whether or not your workstation uses the ACK protocol after it has received an initial acknowledgment as described in the [Wait for initial acknowledgment? (default is yes)] option.

The File Transfer Out function (**F5**) operates using a protocol with positive acknowledgment. Positive acknowledgment sends an acknowledgment (ACK) character in response to a correctly received record, or a negative acknowledgment (NAK) character in response to a record received with errors. This option determines whether or not this protocol is used.

The default is yes. If you do not enter a response, your workstation selects the positive acknowledgment (ACK) protocol.

*[Retransmit line if receive non ACK char.? (default = yes)]*

This option determines whether your workstation should retransmit data if the other computer system receives something other than the ACK character described in the [ACK character (default = 06H)] option.

Enter yes if you want to retransmit the data.

The default is yes. If you do not enter a response, your workstation automatically retransmits data if the other computer system does not receive the ACK character.

*[Block begin character; (default = STX;02H)]*

This option assigns an ASCII number to represent start of text (STX).

All blocks of data (128-bytes or less) start with STX.

The default is STX;02h. If you do not enter a response, Basic ATE assigns 02h as the ASCII number for STX.

*[Block end character; (default = ETX;03H)]*

This option assigns an ASCII number to represent end of text (ETX).

All blocks of data (128-bytes or less) end with ETX.

The default is ETX;03h. If you do not enter a response, Basic ATE assigns 03h as the ASCII number for ETX.

## File Recording (F6)

The File Recording function tells your workstation to record (store) all received characters as they display on your screen. This is useful when you want to review or print the received text later. The File Recording function can also be used to transfer files from other incompatible computer systems to your workstation. To do this, the other computer simply transmits each character of the file in sequence.

Note, however, that since the File Recording function does not use the positive acknowledgment protocol, this method of file transfer is susceptible to undetected errors caused by communications line noise. Therefore, use the File Recording function (**F6**) in conjunction with the File Transmit function (**F7**) only if both workstations are incompatible. If the workstations are compatible, use the File Transfer In (**F4**) and the File Transfer Out (**F5**) functions described in the previous sections.

***Note:*** *When Basic ATE records a continuous stream of bytes at high baud rates, the byte stream may not display immediately on your video screen. This delay ensures that no incoming characters are dropped and that the recording is not corrupted. Your video screen resumes in time to display the last few pages of the incoming stream of characters. If any characters are dropped, an error message displays at the end of the recording session.*

## Command Form

File Recording
Filename: _____
[File input mode (overwrite or append; default = append)] _____
[CR/LF mapping mode (binary or new line; default = new line)] _____

## Parameter Fields

***Filename***

This option specifies the name of the file in which to record (store) the incoming data. A new file is created if one does not exist. If a file exists, you may elect to replace the existing file or append the incoming data to the existing file by using the following options.

While you are recording the incoming data, the Status frame displays Recording on File filename (where filename is the name of the file receiving the data). To close the recording file, press **F8**. Basic ATE returns to emulation mode. See "Close Recording File (F8)" later in this section.

There is no default for this option. If you do not specify a file name, the cursor moves under the form and Basic ATE returns to emulation mode.

***[File input mode (overwrite or append; default = append)]***

This option specifies whether the new file replaces the existing file or appends it.

The default is append. If you do not enter a response, the new file is appended to the existing file.

***[CR/LF mapping mode (binary or new line; default = new line)]***

This option selects how to map incoming carriage returns (CRs) and line feeds (LFs).

The binary option copies all characters to the destination file of your workstation exactly as they are received.

The new line option maps all received CRs (0Dhs) and LFs (0Ahs) to the destination file of your workstation's RETURNs (0Ahs) according to the following algorithm. A single CR, a single LF, or a CR/LF combination maps into a single RETURN at your workstation.

The default is new line. If you do not enter a response, Basic ATE uses the new line mapping mode.

## File Transmit (F7)

The File Transmit function instructs your workstation to transfer files to a receiving computer system by transmitting each character in sequence.

The File Transmit function does not use the positive acknowledgment protocol; therefore, this method of file transfer is susceptible to undetected errors caused by communications line noise. Therefore, use the File Transmit function (**F7**) in conjunction with the File Recording function (**F6**) only if both workstations are incompatible. If the workstations are compatible, use the File Transfer In (**F4**) and the File Transfer Out (**F5**) functions described in previous sections.

When Basic ATE begins transmission, the data being transmitted displays in the interactive window of your video screen only if the Display mode is set for half duplex, or if the receiving computer echoes the data back (in echoplex mode) to your workstation. During transmission, the Status frame displays File Transmission in Progress.

Basic ATE closes the file and returns to normal operation when the file has been transmitted. At the end of transmission, the Status frame displays File Transfer Complete.

To request a premature termination of the transmission, press **ACTION-CANCEL.**

***Note:*** *The receiving computer system should be set up by using the File Recording function (F6) before the File Transmit function starts. Otherwise, the receiving computer may not actually be recording the transmitted file.*

## Command Form

File Transmit
Filename: _____
[New line mapping mode (binary, CR, or CRLF; default = CRLF)] _____
[Line control mode (none, Xon/Xoff,or CTS; default = none)] _____

## Parameter Fields

***Filename***

This option specifies the name of the file you are sending.

When Basic ATE runs, the Status frame displays File Transmission in Progress. At the end of the transfer, the Status frame displays File Transfer Complete.

There is no default for this option. If you do not specify a file name, the screen beeps and displays No File Name Specified, Transfer Not Started, in the Status frame. In addition, Basic ATE returns to emulation mode. Press **F7** and start over.

***[New line mapping mode (binary, CR, or CRLF; default = CRLF)]***

This option selects how to map incoming carriage returns (CRs) and line feeds (LFs).

The binary option transfers the file exactly as is. The binary option allows Basic ATE to transfer binary data.

The CR option replaces all of your workstation's RETURNs (0Ah) with ASCII CRs (0Dh) before transmitting a file. The CR option allows Basic ATE to emulate an ASCII terminal.

The CRLF option replaces your workstation's RETURNs (0Ah) with ASCII CRLF character pairs (0Dh/0Ah) before transmitting a file. The CRLF option allows Basic ATE to emulate a host computer by transmitting the CRLF combination.

The default is CRLF. If you do not enter a response, Basic ATE selects the CRLF mapping mode.

***[Line control mode (none, Xon/Xoff, or CTS; default = none)]***

This option selects how the receiving computer system controls the data that is transmitted from your workstation.

Xon/Xoff line control suspends transmission upon receipt of an Xoff control character (13h) until your workstation receives the next Xon control character (11h). For example, if the receiving computer system needs time to process data, it sends Xoff to your workstation. In response, your workstation stops sending data until it receives Xon from the receiving workstation.

Clear-to-send (CTS) line control suspends file transmission from the time the CTS signal becomes inactive until it becomes active again. CTS is used by devices to control data flow. For example, if a device needs more time, it forces CTS to be inactive, at which time your workstation stops transmitting data. When the device is ready, it sends an active CTS, signifying that your workstation can again transmit data.

The default is none. If you do not enter a response, the receiving computer system does not control the data flow from your workstation.

## Close Recording File (F8)

The Close Recording File function closes the recording file you specified with the File Recording function (**F6**). Basic ATE closes the recording file and continues to operate normally. If you press this function key when a recording file is not open, nothing happens.

## Command Form

This function has no command form.

## Parameter Fields

This function has no parameter fields.

## Data/Voice Mode Convert (F9)

The Data/Voice Mode Convert function converts an existing data call to a voice call or vice versa. For example, if you want to convert a voice call that is in progress to a data call, press **F9**. This connects the Voice Processor Module modem to the telephone line and disconnects the telephone handset.

Basic ATE does not recognize the Data/Voice Mode Convert option unless you specify the Voice Processor Module modem in the [Comm channel] option, as described in "Basic ATE Command Form" earlier in this section.

## Command Form

This function has no command form.

## Parameter Fields

This function has no parameter fields.

## Workstation Keyboard for SRP Debugging (F10)

This key is an option for debugging on the Shared Resource Processor (XE-520, XE-530, or SRP). To debug on the Shared Resource Processor, you must either attach a dumb terminal or a workstation running Basic ATE to a communications port on a board. The **F10** function key acts as a toggle key. If you press **F10**, you toggle the keyboard from the regular Basic ATE mode to the "workstation keyboard for SRP debugging" mode. If you press **F10** again, the keyboard returns to regular Basic ATE mode. For more information, see the CTOS Debugger User's Guide.

You can use the normal function keys available in the CTOS Debugger. For example, the **MARK**, up-arrow, and down-arrow keys work as expected to the Shared Resource Processor debugger.

## Command Form

This function has no command form.

## Parameter Fields

This function has no parameter fields.

# Interrupting Basic ATE

You can interrupt Basic ATE as follows:

| Key | Interruption |
|---|---|
| **ACTION-CANCEL** | 1. Terminate data transmission.<br>2. Return to the interactive window. |
| **FINISH** | 1. Exit from Basic ATE.<br>2. Enter the Context Manager/Executive after data transmission. |
| **CANCEL** | 1. Exit Basic ATE command form.<br>2. Enter Context Manager/Executive.<br>or<br>1. Exit Basic ATE function key form.<br>2. Return to the interactive window. |
| **MARK** | 1. Break function. |

These are described in the following subsections.

### Action-Cancel Keys

Press **ACTION-CANCEL** when you want to terminate a data transmission (either send or receive) but do not want to exit from Basic ATE.

### Finish Key

Press **FINISH** after the data transfer when you want to exit from Basic ATE and enter either the Context Manager or the Executive. Basic ATE waits until the data transfer has finished before exiting.

### Cancel Key

Press **CANCEL** when you want to exit from the Basic ATE command form and return to either the Context Manager or the Executive, or when you want to exit a Basic ATE function key form and return to the interactive window.

| | |
|---|---|
| **Mark Key** | Press **MARK** to hold the line down for 20 milliseconds. Some host computers recognize this as a break function, which tells them to finish or break from a program that is running. |

# ASCII Control Characters

In general, characters typed at the keyboard are interpreted literally. However, the **CODE** key is used as the "control" key. Keys such as **TAB**, **BACKSPACE**, **RETURN**, and **DELETE** generate appropriate ASCII equivalents. ASCII ESC (escape) is generated by the **GO** key, ASCII CR by the **RETURN** key, LF by the **down-arrow** key. Keys with no appropriate ASCII equivalent are ignored; pressing them causes the audio alarm to sound momentarily.

Received characters, including the video escape character (0FFh), display by the Sequential Access Method (SAM).

# Section 3
# Creating a Script File

## Introduction

Basic ATE uses a script file, or command list, to handshake (communicate) with another workstation or computer system. The script file can perform an automatic signon sequence to access a remote host computer as follows:

| Host System Prompts | Your Workstation Responds |
|---|---|
| Enter ID | Joe |
| Enter password | 1289382 |
| : | Stock Quote |

In this example, your workstation waits for the correct prompts and provides the appropriate responses to access the stock quotes.

To use a script file, simply type the name of the script file. If you choose not to use a script file, you must manually type the needed information every time you want to access the other computer.

***Note:*** *When you create files in one of the word processing or office publishing packages, your workstation automatically places special transparent control characters at the end of each file. These characters may not be recognized by certain modems, causing inaccurate data transmission. Before sending these files via a modem, delete the special characters by using the Remove Format command. (See your word processing documentation.)*

When communicating with remote computer systems, you often need to send hexadecimal characters. If a character is required that is not on your keyboard, you can use a hexadecimal equivalent by pressing **CODE-I** in the Editor. This allows you to type the appropriate hexadecimal values that correspond to the ASCII code. (See the *CTOS Editor User's Guide*.)

## Acceptable Script File Words

The following words can be used when writing a script file:

| Word | Description |
|---|---|
| Delay | Can consist of an integer only. Each unit represents 100 milliseconds. |
| Send | Consists of alphanumeric or control characters. |
| WaitFor | Consists of alphanumeric or control characters. |

Note that uppercase and lowercase words are not distinguished, but they aid in readability.

## Writing An Automatic Signon Sequence

Assume that you want to sign onto a host system and check a stock quote. The host system first prompts for Enter ID:. After you receive the prompt, you type in your user ID and then receive an Enter password: prompt. You then enter your valid password. The host system responds by sending a colon (:), indicating you have successfully signed onto the system. You then type Stock Quote for a reading of the available stock categories.

Instead of rekeying the above information each time you sign onto the host system, you can create the following script file that will perform the automatic signon for you. Open a file and type the following:

```
WaitFor("Login:")
Send("Joe")
WaitFor("Password:")
Send("1289382")
WaitFor(":")
Send("Stock Quote")
```

To add a 200-millisecond delay, add the following sentence to the script file:

```
Delay ("2")
```

When you run Basic ATE, fill in the [Script filename] option with the name of the file you specified as the script file. When Basic ATE runs, it will do the rest.

# Section 4
# Basic ATE Protocols

## Introduction

This section gives a general description of asynchronous serial protocols as follows:

- General
- Baud rate
- Data flow
- Common protocols

## General

Asynchronous serial transmission signifies that a transmitting workstation sends characters (data) one bit at a time to a receiving workstation. The transmission does not depend upon any internal clocks and, therefore, it can occur at any time (that is, asynchronously).

For asynchronous transmission, each transmitted character must have flags to inform the other computer when it begins and ends its transmission. The first of these flags is called a start bit, which signifies the start of the character. This is followed by five to eight data bits that are encoded into an ASCII number. These bits are the actual character. (Note that other codes such as EBCDIC and Baudot can replace ASCII using different code values.) A parity bit is often used after the data bits for error checking. Finally, either one or two stop bits signifies the end of the character. Two stop bits are used frequently during slow transmission for end-of-character recognition. Faster transmissions use one stop bit.

Various parity-checking modes are available, as follows:

- Even
- Odd
- 0
- 1

# Baud Rate

Data is transmitted at certain speeds, called baud rates, which specify how many bits of data pass a point in one second. Typical baud rates are: 110, 300, 1200, 2400, and 9600.

The most common baud rates are 300, 1200, and 2400 baud when using a modem. Printers usually operate at 1200 baud, and direct cable connections frequently transmit at 9600 baud.

When using Basic ATE, both the transmitting and receiving workstations must use the same baud rate.

# Data Flow

During a transmission, data can flow as follows:

- From one workstation to another in one direction only. This is simplex mode.
- From one workstation to another in both directions, but in only one direction at a time. This is half duplex (hdx) mode.
- From one workstation to another in two directions, in both directions at the same time. This is full duplex (fdx) mode.
- From a transmitting workstation to a receiving workstation (that specified echoplex), where it is echoed back to the transmitting workstation. This is echoplex (echoplex) mode.

When using Basic ATE, you can specify half duplex, which displays each character as it is transmitted. Note, however, that half duplex transmission can accept only one data direction at a time. Therefore, what you see on your screen is not necessarily what the receiving screen shows. For example, a character may have been lost because of a transmission failure, but your screen would still display the character.

If you specify full duplex, both ends of the transmission line can transfer and receive data simultaneously. Your video screen does not display each character as it is sent in this mode.

If you specify echoplex, the data transmitted from another workstation echoes from your workstation back to the transmitting workstation. Therefore, echoplex can be used to determine transmission accuracy.

The most common form of data flow is full duplex mode because it allows simultaneous data transmission in both directions. Full duplex mode, however, does not allow you to see what you type. Instead, you can use half duplex mode, which allows you to see what you transmit as you type. The drawback to half duplex mode is that you can transmit data in only one direction at any time. Finally, echoplex mode can be used for error checking at one of the workstations because the data echoes back to the applicable transmitting workstation.

# Common Protocols

## Positive Acknowledgment Protocol

The most reliable transmission protocol you can use between compatible workstations is positive acknowledgment. This protocol uses the File Transfer In (**F4**) and the File Transfer Out (**F5**) functions for handshaking. When using this protocol, you can specify either an ASCII or a binary mode of transmission. These are explained in the following paragraphs.

In both the ASCII and binary modes, the sender initiates the file transfer. (The sender can be designated as either your workstation or the other computer.) The sender repeatedly transmits an ASCII SOH (01h) character for start-of-heading until the receiver responds with an ACK (06h) character for acknowledgment.

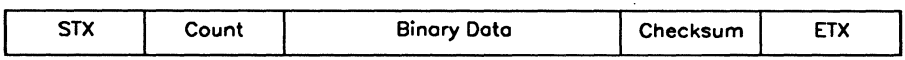
At this time, the file transfer begins. The sender transmits a data block (binary or ASCII) in the specified format. The receiver responds with either a positive or negative acknowledgment, indicated by an ASCII ACK (06h) character for positive acknowledgment or an ASCII NAK (15h) character for negative acknowledgment When the sender receives a negative acknowledgment, it retransmits the block.

The sender signals completion of transfer by transmitting an ASCII EOT (04h) character for end-of-transmission.

## Binary Block Format

The format of a block using the binary file transfer mode is shown in Figure 4-1. It consists of an ASCII STX (02h) character for start-of-text, followed by a binary count of the number of characters in the block. Note that this count includes the data characters and the checksum character but not the STX, count, or ETX (end-of-text, 03h) characters.

Then comes the actual data to be transferred, followed by a twos complement checksum, and finally an ASCII ETX character. The checksum is computed such that the binary sum of all data characters (not including STX, count, or ETX) and the checksum character is an integral multiple of 256. (That is, the checksum character is the twos complement of the low-order 8 bits of the arithmetic sum of the data characters.)

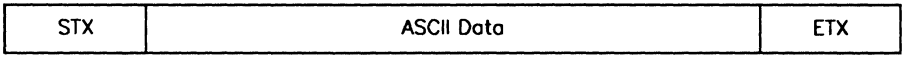



2408.4-1

**Figure 4-1. Binary Block Format**

## ASCII Block Format

The format of a block using the ASCII file transfer mode is shown in Figure 4-2. It consists of an ASCII STX (02h) character for start-of-text, followed by the ASCII data to be transferred, and finally an ASCII ETX (03h) character for end-of-text.




2408.4-2

**Figure 4-2. ASCII Block Format**

## Block Sizes

In both ASCII and binary file transfer modes, each received block can contain up to 254 data characters. In binary format, each transmitted block, except possibly the last one, contains 128 data characters. The last block of the file may be smaller than 128 characters. In ASCII format, each transmitted block contains a line of ASCII data characters. A line extends to the first encountered LF (line feed). If no LF is encountered, the block contains 128 bytes.

## Xon/Xoff Protocol

If a slow device cannot process information fast enough to keep up with the transmitting device, it sends an ASCII Xoff (13h) character, signifying that its buffer has filled up. The transmitting workstation immediately stops sending data until it receives an ASCII Xon (11h) character, which signifies that the slow device is ready to receive more data.

## Clear-To-Send Protocol

The clear-to-send (CTS) protocol uses pin assignments on the cable between computers for communicating. When the transmitting device is ready to send data, it issues an active data-terminal-ready (DTR) signal from pin 20 on the cable to the receiving computer. If the receiving computer is ready for data, it enables the data flow by activating the CTS signal at pin 5 on the cable. At all other times, this pin is disabled, prohibiting data flow to the receiving computer.

# Section 5
# Troubleshooting

## Introduction

This section is divided into three parts. The first part provides general troubleshooting information that you can use when running Basic ATE.

The second part describes how to troubleshoot the physical components of Basic ATE, including cabling, modems, the telephone line, and the Voice Processor Module.

The last part of this section lists specific error codes that you may see on your screen while running Basic ATE and tells you how to interpret the error codes. It includes common Voice Processor Module error codes.

## General Troubleshooting Information

### Parity

If data transmitting from one workstation to another is displayed as reverse video, the parity used between the two workstations may not be the same. You can change the parity mode by using the **F2** function key as described in Section 2, "A Closer Look at Basic ATE." If the characters still display in reverse video, check for loose cables.

### Baud Rate

If you are receiving too many data characters at higher baud rates and too few characters at lower baud rates from a remote workstation, verify that the baud rates between the modems (Voice Processor Modules) and the workstations are the same.

## Modems

Most, but not all, modems contain LEDs signifying the following:

- The modem is transmitting
- The modem is receiving data
- Your workstation has sent a request-to-send signal
- The modem has returned a clear-to-send signal

If your modem does not have LEDs, you can troubleshoot it with a breakout box, an electronic device that has an RS-232-C interface on both sides. The breakout box is equipped with the necessary LEDs for troubleshooting your modem.

When you transmit data, check to see that the request-to-send LED lights up first, followed by the clear-to-send LED. The workstation must receive the clear-to-send signal before the transmit LED lights up. If this sequence is out of order, check your modem by running its self-test diagnostics described in the manufacturer's modem manual. If the modem is operating correctly, check your cable as described in previous sections.

When you receive data, verify that the carrier-detect LED lights up before the receive LED lights up.

***Note:*** *When you create files in one of the word processing or office publishing packages, your workstation automatically places special transparent control characters at the end of each file. These characters may not be recognized by certain modems, causing inaccurate data transmission. Before sending these files via a modem, delete the special characters by using the Remove Format command. (See your word processing documentation.)*

# Physical Components

Figure 5-1 shows three ways you can set up your workstation. Each setup is described in the following subsections.

## Using An RS-232-C Straight Cable and a Modem

To troubleshoot this configuration, start at the most general problem area and work toward the specific: start at the telephone line and work toward the workstation.

### Telephone Line

There are several reasons that data can be affected when it is transmitted over telephone lines. The most common reasons for inaccurate data transmission over a telephone line are jitter, delay distortion, and propagation delay.

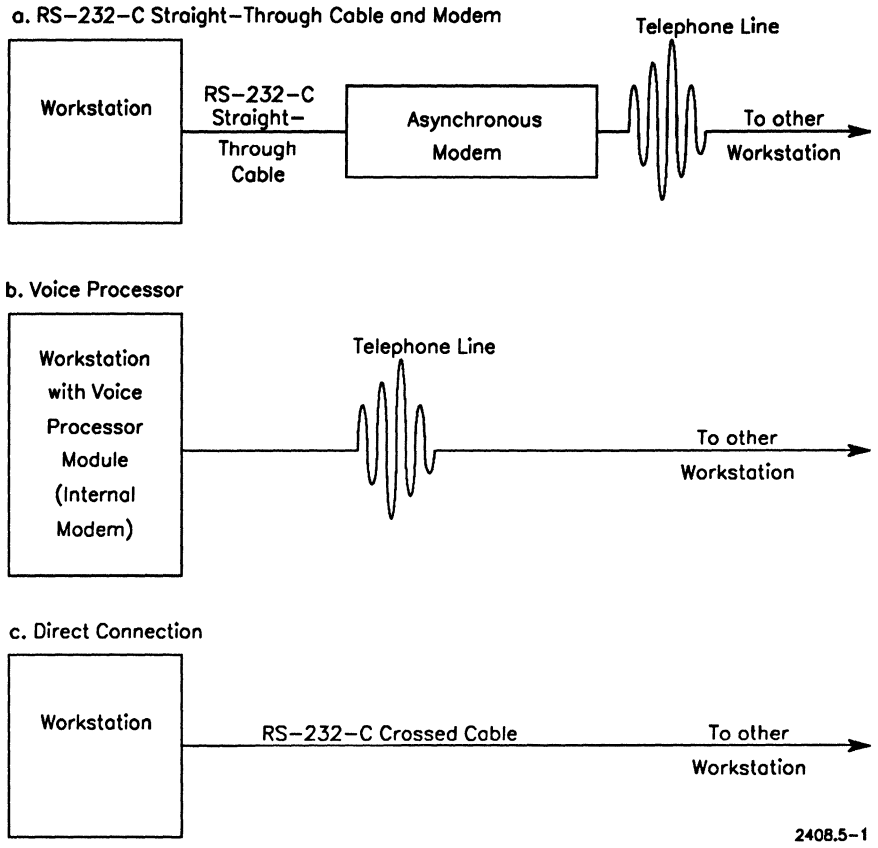



**Figure 5-1. Workstation Setups**

**Jitter.** Jitter results when an unstable signal travels over the telephone line. Each character of a data transmission is a series of high and low signal transitions that occurs at precise time periods. Any noise in the telephone line (such as electromagnetic interference) may cause these transitions to occur either too early or too late, resulting in inaccurate data transmission.

Some jitter is to be expected during long distance data transmission because the signal becomes weaker as it travels farther and therefore becomes more susceptible to interference.

**Delay Distortion.** Delay distortion is the amount of variation in delay time for different parts (frequency components) of a signal and it occurs during long distance communications. It may increase the chances for data transmission failure.

**Propagation Delay.** Propagation delay is the time it takes for a signal (data) to travel from one point to another over the telephone line. This delay may seem exceptionally long when data is transmitted over long distances.

Any of these situations can cause inaccurate data transmission. If you notice inaccurate data transmission, try the following:

1. Redial the telephone number for a better telephone line connection. Each time you make a telephone call, the transmission takes the most convenient route through the telephone network.
2. Use another telephone line. The current line may not be functioning properly.

### Modem

1. Check the modem for proper operation, including switch settings.
2. Check that modems at both ends of the transmission line are set with the same values.
3. Perform all modem self-tests described in your modem manual.

### RS-232-C Straight-Through Cable

1. Check that the RS-232-C cable between your workstation and the modem is connected to the correct channel of your workstation.
2. Verify that the RS-232-C cable is a straight-through cable, and verify the pin connections as shown in the following chart:

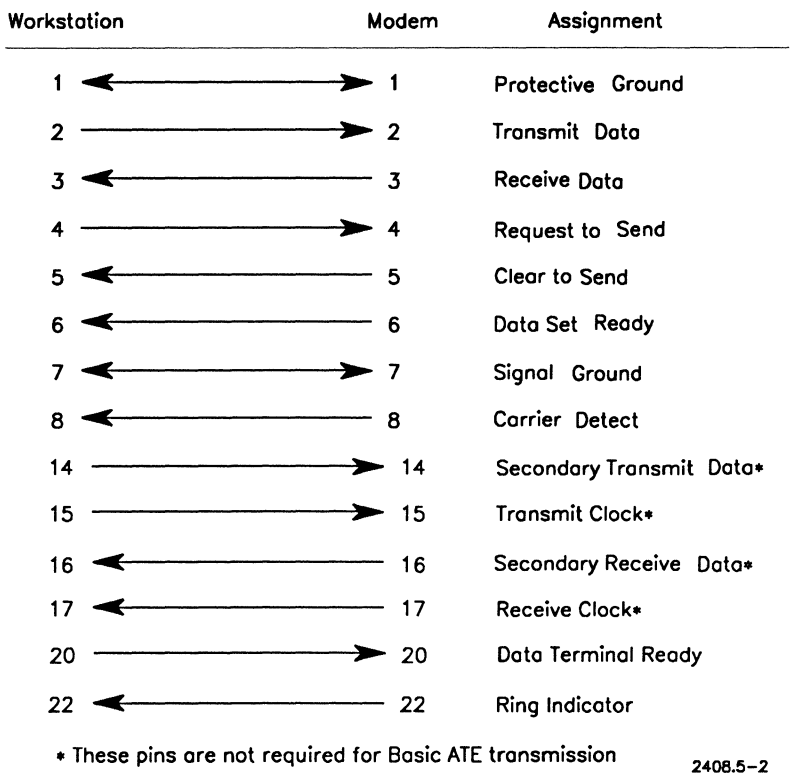

Workstation
Modem
Assignment
1 1 Protective Ground
2 2 Transmit Data
3 3 Receive Data
4 4 Request to Send
5 5 Clear to Send
6 6 Data Set Ready
7 7 Signal Ground
8 8 Carrier Detect
14 14 Secondary Transmit Data*
15 15 Transmit Clock*
16 16 Secondary Receive Data*
17 17 Receive Clock*
20 20 Data Terminal Ready
22 22 Ring Indicator
* These pins are not required for Basic ATE transmission
2408.5-2

**Figure 5-2. Straight Through Cable Pin Connections**

## Workstation

1. Check that your workstation is not malfunctioning by performing the communications diagnostics described in the diagnostics manual for your system.
2. Try another application and see if it works.

## Using The Voice Processor Module

To troubleshoot this configuration, start at the most general problem area and work toward the specific: start at the telephone line and work toward the workstation.

### Telephone Line

There are several reasons that data can be affected when it is transmitted over telephone lines. The most common reasons for inaccurate data transmission over a telephone line are jitter, delay distortion, and propagation delay.

**Jitter.** Jitter results when an unstable signal travels over the telephone line. Each character of a data transmission is of a series of high and low signal transitions that occurs at precise time periods. Any noise in the telephone line (such as electromagnetic interference) may cause these transitions to occur either too early or too late, resulting in inaccurate data transmission.

Some jitter is to be expected during long distance data transmission because the signal becomes weaker as it travels farther and therefore becomes more susceptible to interference.

**Delay Distortion.** Delay distortion is the amount of variation in delay time for different parts (frequency components) of a signal and occurs during long distance communications. It may increase the chances for data transmission failure.

**Propagation Delay.** Propagation delay is the time it takes for a signal (data) to travel from one point to another over the telephone line. This delay may seem exceptionally long when data is transmitted over long distances.

Any of these situations can cause inaccurate data transmission. If you notice inaccurate data transmission, try the following:

1. Redial the telephone number for a better telephone line connection. Each time you make a telephone call, the transmission takes the most convenient route via the telephone network.
2. Use another telephone line. The current line may not be functioning properly.

### Workstation and Voice Processor Module

1. To check that your workstation, including the Voice Processor Module, is not malfunctioning, perform the communications and Voice Processor Module diagnostics described in the diagnostics manual for your system.
2. Try another application and see if it works.

## Using A Direct Connection

To troubleshoot this configuration, check the cable and then the workstation.

### RS-232-C Crossed Cable

1. Check that the RS-232-C crossed cable between your workstation and the other workstation is connected to the correct channel of your workstation.
2. Verify that the RS-232-C cable is a crossed cable, and verify the pin connections as shown in the following chart:

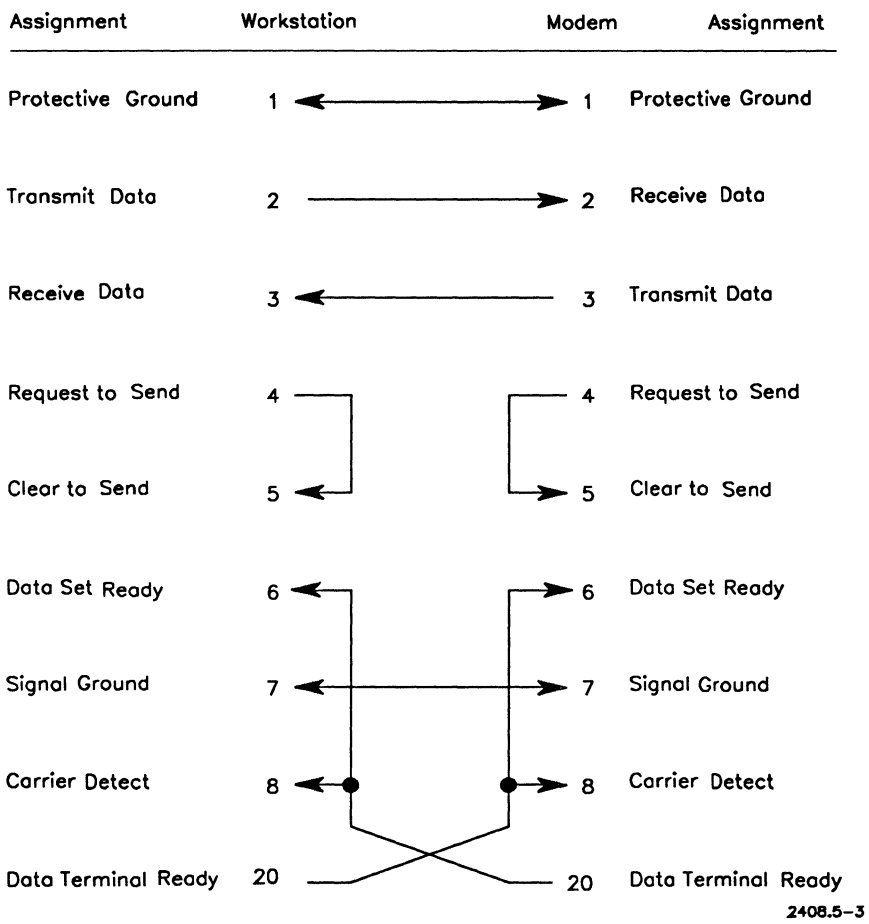



**Figure 5-3. Crossed Cable Pin Connections**

## Workstation

1. Check that your workstation is not malfunctioning by performing the communications diagnostics described in the diagnostics manual for your system.
2. Try another application and see if it works.

# Error Codes On Your Screen

This section lists the most common error codes that may occur while you are using Basic ATE. If you receive error codes that are not listed in this guide, refer to the *CTOS Status Codes Reference Manual.*

**Table 5-1. Error Codes On Your Screen**

| Error Code | Explanation |
|---|---|
| 4 | Operator intervention |
| | You pressed **FINISH.** Enter Basic ATE again. |
| 8400 | Invalid line number |
| | The line you are attempting to use does not exist. Enter Basic ATE using an existing line. |
| 8401 | Line in use |
| | The line number that you are attempting to use is already in use by other communications software. For example, if you are attempting to use channel B, the Spooler may have opened the channel for a serial printer, or another communications server, such as RJE 2780/3780, may be using it. |
| | Reconfigure either Basic ATE or the application that is using the line. |

# Voice Processor Module Error Codes

This section lists the most common error codes that may occur while you are using Basic ATE with the Voice Processor Module. If you receive error codes that are not listed in this guide, refer to the *CTOS Status Codes Reference Manual.*

**Table 5-2. Voice Processor Module Error Codes**

| Error Code | Explanation |
|---|---|
| 11203 | Invalid parameters<br><br>The parameters to the specified operation are not valid. |
| 11270 | Bad dial character<br><br>A character specified in the dial string is not valid. Valid characters are:<br><br>0–9<br>A–Y<br>a–y<br>*<br>#<br>%<br>&<br>@<br>=<br><br>Invalid characters are:<br><br>Q, q<br>Z, z |
| 11271 | Dialing in progress<br><br>A TsDial or TsDataOpenLine service is in progress using the dialing hardware. |
| 11272 | No dial tone: Busy<br><br>A busy signal was detected instead of a dial tone when a Wait for Dial Tone command (=) was processed. |
| 11273 | No dial tone: Fast busy<br><br>A fast busy signal was detected instead of a dial tone when a Wait for Dial Tone command (=) was processed. |
| 11274 | No dial tone<br><br>No dial tone was detected when a Wait for Dial Tone command (= or ?=) was processed.<br><br>Verify that your phone connection is working, and try again. |

continued

**Table 5-2. Voice Processor Module Error Codes** (cont.)

| Error Code | Explanation |
|---|---|
| 11276 | Too many characters to dial<br><br>No more than 64 characters can be processed at a time. |
| 11278 | No answer |
| 11280 | Line in use |
| 11281 | Invalid line specification<br><br>The line specified in a TsDataOpenLine or TsDataUnAcceptCall operation is invalid. Valid line specifications are: line 1, line 2, A, or B. |
| 11285 | Modem driver not installed<br><br>When you use [phone] 1 or [phone] 2, you need the Telephone System Service with modem drivers installed on your system.<br><br>This error means the Telephone System Service was installed without the modem drivers. Either you responded N or you used the default (No) when prompted by "Install Modem Drivers?" in the Install Telephone Service command.<br><br>Deinstall the Telephone System Service, then reinstall with the modem drivers by responding Y to the question "Install Modem Drivers?" in the Install Telephone Service command. |
| 11286 | Lost carrier<br><br>The modem lost the carrier signal. Either the carrier or the other telephone hung up. |
| 11287 | Data overrun<br><br>The TsDataRead operation was returned due to a data overrun. Data was lost because the application failed to issue TsDataRead operations fast enough to keep up with the modem, or because of multiple parity errors. |
| 11288 | Bad parity<br><br>The TsDataRead or TsDataWrite operation was returned because bad parity was detected.<br><br>Check for possible telephone line problem. |

continued

**Table 5-2. Voice Processor Module Error Codes** (cont.)

| Error Code | Explanation |
|---|---|
| 11289 | TsDataRead or TsDataWrite timeout<br><br>The TsDataRead or TsDataWrite operation was returned because the time limit specified in the operation was reached. |
| 11292 | Line in use: accept call issued<br><br>A TsDataOpenLine to accept a call has already been issued for the specified line. Try again after the current session. |
| 11293 | Line in use: modem active<br><br>An open modem session is already in progress on the specified line. Try again after the current session. |
| 11294 | Line in use: modem error<br><br>An open modem session has been terminated with a nonrecoverable error, and the Telephone Server is waiting for a TsDataClose operation or program termination before freeing the modem for other use. |

# Appendix A
# Basic ATE Line Control and ASCII Codes

## Basic ATE Line Control Codes

The Basic ATE line control codes are shown in the following table.

**Table A-1. Basic ATE Line Control Codes**

| Code Key | Hexadecimal Number | Description |
|---|---|---|
| **Code-Help** | 00 | NUL (Null) |
| **Code-A** | 01 | SOH (Start of Header) |
| **Code-B** | 02 | STX (Start of Text) |
| **Code-C** | 03 | ETX (End of Text) |
| **Code-D** | 04 | EOT (End of Transmission) |
| **Code-E** | 05 | ENQ (Enquiry) |
| **Code-F** | 06 | ACK (Acknowledge) |
| **Code-G** | 07 | BL (Bell) |
| **Code-H** | 08 | BS (Back Space) |
| **Code-I** | 09 | HT (Horizontal Tabulation) |
| **Code-J** | 0A | LF (Line Feed) |
| **Code-K** | 0B | VT (Vertical Tabulation) |
| **Code-L** | 0C | FF (Form Feed) |
| **Code-M** | 0D | CR (Carriage Return) |
| **Code-N** | 0E | SO (Shift Out) |

continued

**Table A-1. Basic ATE Line Control Codes** (cont.)

| Code Key | Hexadecimal Number | Description |
|---|---|---|
| **Code-O** | 0F | SI (Shift In) |
| **Code-P** | 10 | DLE (Data Link Escape) |
| **Code-Q** | 11 | DC1 (Xon) |
| **Code-R** | 12 | DC2 |
| **Code-S** | 13 | DC3 (Xoff) |
| **Code-T** | 14 | DC4 |
| **Code-U** | 15 | NAK (Negative Acknowledgment) |
| **Code-V** | 16 | SYN (Synchronous Idle) |
| **Code-W** | 17 | EOB (End of Transmission Block) |
| **Code-X** | 18 | CN (Cancel) |
| **Code-Y** | 19 | EOM (End of Message) |
| **Code-Z** | 1A | SB (Substitute Character) |
| **Code-Go** | 1B | ESC (Escape) |
| **Code-F7** | 1C | FS (File Separator) |
| **Code-F8 or Code-]** | 1D | GS (Group Separator) |
| **Code-F9** | 1E | RS (Record Separator) |
| **Code-Delete** | 1F | US (Unit Separator) |

# ASCII Codes

The following ASCII (hexadecimal) codes are given below for each character:

- 8-bit ASCII code
- 7-bit ASCII code
- Even parity ASCII code
- Odd parity ASCII code

**Table A-2. ASCII Codes**

| Key | 8-Bit | 7-Bit | Even Parity | Odd Parity |
|---|---|---|---|---|
| A | C1 | 41 | 41 | C1 |
| B | C2 | 42 | 42 | C2 |
| C | C3 | 43 | C3 | 43 |
| D | C4 | 44 | 44 | C4 |
| E | C5 | 45 | C5 | 45 |
| F | C6 | 46 | C6 | 46 |
| G | C7 | 47 | 47 | C7 |
| H | C8 | 48 | 48 | C8 |
| I | C9 | 49 | C9 | 49 |
| J | CA | 4A | CA | 4A |
| K | CB | 4B | 48 | CB |
| L | CC | 4C | CC | 4C |
| M | CD | 4D | 4D | CD |
| N | CE | 4E | 4E | CE |
| O | CF | 4F | CF | 4F |
| P | D0 | 50 | 50 | D0 |

continued

**Table A-2. ASCII Codes** (cont.)

| Key | 8-Bit | 7-Bit | Even Parity | Odd Parity |
|---|---|---|---|---|
| Q | D1 | 51 | D1 | 51 |
| R | D2 | 52 | D2 | 52 |
| S | D3 | 53 | 53 | D3 |
| T | D4 | 54 | D4 | 54 |
| U | D5 | 55 | 55 | D5 |
| V | D6 | 56 | 56 | D6 |
| W | D7 | 57 | D7 | 57 |
| X | D8 | 58 | D8 | 58 |
| Y | D9 | 59 | 59 | D9 |
| Z | DA | 5A | 5A | DA |
| a | E1 | 61 | E1 | 61 |
| b | E2 | 62 | E2 | 62 |
| c | E3 | 63 | 63 | E3 |
| d | E4 | 64 | E4 | 64 |
| e | E5 | 65 | 65 | E5 |
| f | E6 | 66 | 66 | E6 |
| g | E7 | 67 | E7 | 67 |
| h | E8 | 68 | E8 | 68 |
| i | E9 | 69 | 69 | E9 |
| j | EA | 6A | 6A | EA |
| k | EB | 6B | EB | 6B |
| l | EC | 6C | 6C | EC |
| m | ED | 6D | ED | 6D |
| n | EE | 6E | EE | 6E |

continued

**Table A-2. ASCII Codes** (cont.)

| Key | 8-Bit | 7-Bit | Even Parity | Odd Parity |
|---|---|---|---|---|
| o | EF | 6F | 6F | EF |
| p | F0 | 70 | F0 | 70 |
| q | F1 | 71 | 71 | F1 |
| r | F2 | 72 | 72 | F2 |
| s | F3 | 73 | F3 | 73 |
| t | F4 | 74 | 74 | F4 |
| u | F5 | 75 | F5 | 75 |
| v | F6 | 76 | F6 | 76 |
| w | F7 | 77 | 77 | F7 |
| x | F8 | 78 | 78 | F8 |
| y | F9 | 79 | F9 | 79 |
| z | FA | 7A | FA | 7A |
| 0 | B0 | 30 | 30 | B0 |
| 1 | B1 | 31 | B1 | 31 |
| 2 | B2 | 32 | B2 | 32 |
| 3 | B3 | 33 | 33 | B3 |
| 4 | B4 | 34 | B4 | 34 |
| 5 | B5 | 35 | 35 | B5 |
| 6 | B6 | 36 | 36 | B6 |
| 7 | B7 | 37 | B7 | 37 |
| 8 | B8 | 38 | B8 | 38 |
| 9 | B9 | 39 | 39 | B9 |
| SP | A0 | 20 | A0 | 20 |
| ! | A1 | 21 | 21 | A1 |

continued

**Table A-2. ASCII Codes** (cont.)

| Key | 8-Bit | 7-Bit | Even Parity | Odd Parity |
|---|---|---|---|---|
| " | A2 | 22 | 22 | A2 |
| # | A3 | 23 | A3 | 23 |
| $ | A4 | 24 | 24 | A4 |
| % | A5 | 25 | A5 | 25 |
| & | A6 | 26 | A6 | 26 |
| ' | A7 | 27 | 27 | A7 |
| ( | A8 | 28 | 28 | A8 |
| ) | A9 | 29 | A9 | 29 |
| * | AA | 2A | AA | 2A |
| + | AB | 2B | 2B | AB |
| , | AC | 2C | AC | 2C |
| – | AD | 2D | 2D | AD |
| . | AE | 2E | 2E | AE |
| / | AF | 2F | AF | 2F |

# Glossary

## A

**ASCII**
American Standard Code for Information Interchange. ASCII is a communications standard through which otherwise incompatible computers are able to communicate.

**asynchronous**
An asynchronous transmission is a character transmission controlled by start and stop bits, as opposed to timing.

## B

**baud rate**
The baud rate is the number of bits transmitted in one second.

**buffer**
A buffer is a device that provides temporary storage for data.

**byte**
A byte is a group of eight adjacent bits operated on as a unit.

## C

**carriage return**
*See* CR

**clear-to-send**
*See* CTS

**compatible workstation**
In this manual, a compatible workstation is any workstation manufactured by Unisys or Convergent Technologies, Inc.

**control characters**
Control characters are communications codes used to handshake with a remote computer system.

**CR**
CR specifies that the end-of-line character is a carriage return.

**CRLF**
CRLF specifies that the end-of-line characters are a carriage return/line feed combination.

**CTS**
CTS is a data flow control signal that allows data to flow when active and prohibits data flow when inactive.

## D

**data communications equipment**
*See* DCE

**data terminal equipment**
*See* DTE

**data terminal ready**
*See* DTR

**DCE**
DCE is equipment (such as a modem) that controls data transmission flow.

**DTE**
DTE is equipment (such as a workstation) that can send or receive data.

**DTR**
DTR is a signal issued by the workstation (DTE) indicating that it is ready for transmission.

## E

**echoplex**
Echoplex is a mode of transmission that directs the workstation to "echo" (repeat) characters received from another workstation or remote computer system.

**emulate**
To emulate means to act as another computer system by using a universal standard code, thus allowing compatibility.

## H

**half duplex (hdx)**
Half-duplex mode directs your workstation to send the characters you type to another workstation or remote computer system and display the characters on your workstation.

**handshake**
A handshake is a process whereby control signals are exchanged between your workstation and another device.

## L

**LF (line feed)**
LF specifies that the end-of-line character is a line feed.

## M

**modem (modulator/demodulator)**
A modem is a device used to convert data from a computer system into telephone line signals and vice versa.

## P

**parameter field**
The parameter field is the highlighted area in a command form that appears to the right of each parameter prompt. A field is where you provide information to Basic ATE.

**parameter prompt**
A parameter prompt is a message that asks you to provide the appropriate information in a parameter field.

**parity bit**

A parity bit is a bit stored along with every data byte in memory; the parity bit is used for error checking.

**protocol**

Protocol is a set of conventions that govern the format and timing of message exchanges in order to control data transmission and correct errors.

# X

**Xon/Xoff (transmitter on/transmitter off)**

Xon/ Xoff is a protocol that enables a common communications "handshake" between your workstation and another workstation or other remote computer system or device.

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